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THE PHYSIOLOGY OF WORK

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CHICAGO

The industries of our country have a tremendous task to perform. The successful accomplishment of this task depends primarily on the morale and physical fitness of our man power. Pearl Harbor and the fact that our sons are fighting constitute sufficient motivation for the maintenance of a high morale. It is the province of those charged with the maintenance of industrial health to increase and to conserve the physical fitness of the personnel in the office and in the factory. It is for this reason that I accepted the invitation to discuss "the physiology of work" before this group of physicians, whose responsibility in the emergency that confronts us is large.

Even in ordinary times and apart from any sense of social responsibility, the industrial physician well knows that attention devoted to the health and well-being of executives and laborers is in the interest of efficient management.

In physics and engineering "work" is reduced to a simple formula: Work is done when a force moves a mass against resistance, or when one form of energy is transformed into another. Such transformation is an essential feature of all physiologic processes. Interpreted in physiologic terms, this mechanical conception of work means that if there is no increase in the metabolic rate no work has been performed. However, it is known that when a person performs work in the ordinary sense a constant ratio between energy expenditure and output is not found, even when "muscular work" is performed. This is because the efficiency of the muscular movements varies. The mechanical concept of work is adequate when the mechanical aspects or work is considered. It is also adequate when one desires to calculate approximately the calories of food required to maintain the body when a known amount of muscular work is to be performed. The mechanical concept of work is inadequate when one deals with the output of muscular work as measured by accomplishment, because such factors as muscular efficiency, incentive, staleness and feeling tone are concerned. It is also inadequate when the product of the work arises chiefly from mental processes. Mental effort such as addition and multiplication produces only a small increase in metabolic rate. Finally, the state of mind and the state of nutrition

and health of the worker are immutably linked with performance. The work of man cannot be reduced to a simple formula.

By definition, any one interested in work must be interested in accomplishment, efficiency, fatigue and recuperation. They are all proportional to the length, the rate and the difficulty of the task. Fatigue means a decrease in either organic state, output or subjective feeling tone, which results from previous activity, and is relieved by rest. It is to be noted that the man who complains of feeling tired, though he has done no work, is arbitrarily omitted from this definition. According to my views, such a person is either mentally or physically sick or he needs a little "warming up" exercise.

On the basis of the organic changes in the body resulting from muscular work, different degrees of work are recognized. These will be briefly discussed in turn.

MAXIMAL MUSCULAR WORK

In maximal work the steady state of the body is never reached or cannot be maintained continuously. If continued, the result is breakdown or collapse. Maximal work is defined as that which yields an average metabolic rate of eight or more times the basal metabolic rate. (The basal metabolic rate is 1,600-1,800 calories.) For short periods muscular work may be done at a rate which increases the metabolic rate twenty times above the basal rate. Maximal work is frequently performed in sports or in the laboratory; it is rarely required in industry.

In maximal work the need for "warming up" for greatest accomplishment is generally recognized. The need for rest periods is imperative. At this critical level of work the margin of safety is small. It has been found that the need and preferential utilization of carbohydrate is important in maximal work. Carbohydrate requires 6 per cent less oxygen for its combustion than fat. Except in emergencies, few persons will work at such an intensity as to produce a hyperpyrexia and a critically low blood sugar. Few persons will do even submaximal work to the point at which the plateau value of the heart rate suddenly breaks and rises to the maximal value of impending collapse.

HARD OR HEAVY MUSCULAR WORK

Heavy work is arbitrarily defined as that amount which yields a mean metabolic rate of from three to eight times the basal metabolic rate. It has been suggested that an average of eight times the basal metabolic rate is as much as can be maintained for eight hours. This category of work includes many of the heavy manual jobs in agriculture, building trades, mining, heavy industry and forced marches with a heavy load.

In the performance of heavy work a steady state of the heart rate and output, blood pressure, pulmonary venti-

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From the Department of Physiology and Pharmacology, Northwestern University Medical School.

lation and body temperature is soon attained. However, the person performing heavy work has a reduced margin of safety in regard to heat dissipation and cardiovascular function. The temperature, humidity and movement of the air about him are of vital concern, as is the loss of sodium chloride and water through perspiration. Excessive perspiration calls for extra salt in the diet and drinking water. Clothing is also important, because when the limit of heat dissipation is approached breakdown is imminent.

Heavy work performed over an eight hour period requires for maintenance a diet containing from 3,500 to 5,000 calories, or from 1,800 to 4,800 calories in addition to the basal requirements. Powerful men working longer hours require even a greater allowance, up to 6,000 calories above the basal requirement. In regard to the quality of the food for heavy work, those items supplied by the ordinary diet are adequate if the vitamin and the mineral content are sufficient. Heavy muscular work does not increase the requirement for protein above the usual 70 to 100 Gm., but it does increase the requirement for fat and carbohydrate. Extra vitamins may be required, since extra carbohydrate may increase the need for vitamin B and sweating the need for vitamin C. The fat content of the diet of some persons cannot be too high because their stomachs will not tolerate it. However, fat, as in fasting, can serve as the chief fuel for work. It has been found that a man working at periods during a twenty-four hour fast may utilize 5,000 calories of reserve energy, of which 0.9 per cent is fat, without suffering serious consequences.

Whether a greater output is secured by continuous or intermittent performance of heavy work depends on the load and the individual. As the load is increased, the more the work output is related to the periods of rest. When a group of men are doing such heavy work as to require rest periods, some evidence indicates that supervised rest periods result in a greater output than if the men are allowed to rest as they please. For example, "two officers at the front, for a friendly wager, competed in making equal lengths of trench, each with an equal squad of men. One let his men work as they pleased, but as hard as possible. The other divided his men into three sets, each working five minutes and resting ten. The latter easily won." The same has been observed for a group of molders in an iron foundry, even though the men at first refused to have their rest periods supervised. Since they were on "piece work" and their income increased, they soon agreed to the new plan.

MODERATE MUSCULAR WORK

Moderate work is arbitrarily defined as that amount which yields a mean metabolic rate of less than three times the basal metabolic rate. There is little or no drain on reserve muscular energy. The increase in oxygen consumption, in heart rate and in blood pressure and the changes in the blood are slight. Most of the labor performed in the modern factory and office is of this sort. The work is of such a nature that relatively slight adjustments in physiologic processes are required. The load lifted and the rate and extent of the muscular contractions in the practiced and physically fit person are such that one ordinarily says that the muscular aspect of the work can be indefinitely prolonged. So it is not surprising that after the day's work is done in the factory the worker frequently begins to spend energy at a fast

rate in gardening, ball games or dancing. This is laudable, if not carried to the extent that a night's rest does not permit recuperation.

Regardless of these facts, several hours of continuous moderate muscular or mental work usually produce "fatigue" or an impairment in productivity and a reduction in feeling tone.

IMPAIRMENT OF PRODUCTIVITY

Many things have apparently been found to impair and to improve productivity in factories when the work is moderate. This is true to such an extent that it appears as if almost anything that the management does that attracts the interest of the workers or indicates interest in their welfare improves productivity. This renders it difficult to interpret the results. In many experiments performed to ascertain the effect of a new factor on output only "before and after" output was determined for a relatively short period of time. This is perhaps an adequate type of experiment from a utilitarian point of view, but it is not adequate to determine the specificity of the factor introduced.

Recently it was clearly demonstrated that the output of a group of workers in a shoe factory who ate the ordinary three meals a day was materially increased by providing a forenoon and an afternoon lunch of a glass of milk and a piece of cake. The lunches prevented the usual decrement in production in the latter half of the morning and afternoon. It was concluded that the decrement in output was not due to the work performed but to the operator's need of food. However, one wonders what would have happened to output if the operators had received a bottle of flavored charged water sweetened with saccharin and cellulose cookies flavored with spices and saccharin. Was the improvement in output due to food or was it due to the improvement in the feeling tone that follows ingestion of something appetizing? Or, was it due to the fact that the workers were given something?

The results of the researches conducted in the Western Electric factory in Chicago are of interest in relation to the effect of working conditions on output. The observations were made during a period of five years or 5 women operators experienced in assembling relays. It was found that seasonal environmental changes in temperature and humidity, various types of rest periods, shortening the working day by one-half hour or an hour, the five day work week or a morning lunch, free or brought from home, did not significantly affect the hourly output record. It is to be noted that no extremes in working conditions were tested. The only significant finding was that the output steadily increased during the period of the experiment. As a control, when, with the operators' consent, a return was made to the original conditions of work, with no rest pauses, no special lunches and a full length working week, the daily and weekly output rose to a higher point than ever before. The changes observed could be accounted for only on the basis of psychologic or sociological factors. A study of the effect of intensity of illumination was also made on a large group of operators. It was found that when the light was increased the output increased, because the workers believed that they were expected to produce more, and when the light was decreased the output decreased for the same reason. When a mock change in light bulbs was made, the workers commented favorably on the imagined increase in illumination and produced more.

Those with experience in the field of work know that so-called sociological and psychologic factors cannot be eliminated from any type of work performed by man.

WORK PERFORMED BY SMALL OR SPECIAL MUSCLE GROUPS

Much factory work, such as the assembling of relays and making shoes, as a rule involves standing and the use of special or small groups of muscles. This type of work does not materially increase the total expenditure of energy, but it does increase the intensity of the expenditure of energy by small muscle groups. The burden on the cardiorespiratory system is relatively slight, whereas the burden on the neuromuscular mechanisms of the muscles involved is intense. Even standing is fatiguing. In this connection, it is well known that the adaptation of the circulation of man to standing is still imperfect. The hydrostatic changes embarrass the circulation and the position must be changed, and only the physically fit can stand for long periods of time. However, the expenditure of energy for standing is only about 25 to 50 per cent above the basal metabolic rate. In addition to circulatory embarrassment, the motor nerve endings may undergo fatigue; the sensory nerve endings in muscles, tendons and joints are undoubtedly affected.

Work output and the development of fatigue under conditions of intensive activity of a small group of muscles involve not only the muscles concerned but also the neural units involved in maintaining the activity. It is well known that the block in the fatigue evidenced in maximal voluntary muscular effort is located in the central nervous system and not in the muscles.

So-called fussy work is said to be fatiguing because it consists of several different rhythms and different degrees of effort and precision. This leads to interference. This is also true of mental work. For example, if one must rapidly alternate between addition and subtraction a greater decrease in output will occur than from performing either one alone. Such work requires a rapid "shift of set." However, a purely homogeneous mental task produces a more rapid decrease in output than do varied or heterogeneous tasks, provided the tasks are devoid of the factor of interference. Similarly, homogeneous or monotonous muscular work is said to be "fatiguing" because it is boring. If such work with practice becomes so semiautomatic as to permit conversation, boredom should disappear under healthy social conditions in the factory or office. Witness the lady with her knitting. Rapidly performed monotonous mental and muscular work is believed to be associated with a decrease in output, because the same neural patterns are used over and over again without sufficient rest to provide recuperation. Mental performance, like neuromuscular performance, is not perfectly continuous. It is interspersed with short pauses or blocks which have recuperative function. These blocks increase in length and frequency in proportion to the length and difficulty of the task even in the presence of incentive. The fatigue phenomena of one mental task influences another mental task only in proportion to the similarity of the tasks. The same is largely true of muscular tasks when small groups of muscles are concerned. The transfer of fatigue effects from mental to muscular work is slight. As is well known, heavy muscular exercise influences mental performance because of the tendency to fall asleep.

It is to be noted that the effects of intense muscular work of a small group of muscles and of intense mental work have been referred to in the same paragraph. This was done because certain fatigue manifestations are common to the two and because fatigue or a decrease in output can occur in the office as well as in the factory. It is now established that intense mental effort can produce fatigue or a decrease in output and in feeling-tone. However, there is no evidence showing that mental effort, in the absence of emotional strain, can produce either neuroses or psychoses.

RECUPERATION

Our knowledge regarding one of the most important aspects of work, namely the time required for and the factors concerned in recuperation, is very meager. It is the most neglected aspect of work, both muscular and mental.

Some evidence indicates that an athlete after ten seconds of maximal exertion may not be fully recuperated in one hour. The trainer believes that after an athletic exertion recuperation is incomplete in twenty-four hours. It is believed that a runner cannot do his best daily, and some believe not even weekly. In hand ergographic tests in which small muscle groups are used and the work is carried to exhaustion, the average recovery in a group of subjects is 90 per cent complete in ten minutes and 95 per cent in twenty minutes. In our own work on the stationary bicycle, in which the subject does continuous heavy work as long as he can maintain the same degree of the work, my associates and I find that recovery in ten minutes amounts to from 45 to 80 per cent, depending on the subject; in one hour the recovery is practically complete. This type of work is rarely performed in industry. No physiologic studies have been made on the rate of recovery from the various degrees of neuromuscular fatigue which occur in different types of work that occur in industry. In the practiced and physically fit person it may be complete after thirteen hours, or there may be a fatigue residue that requires twenty-four hours or longer for recuperation.

Meager data indicate that the recovery from the fatigue effects of mental work resembles that of muscular work. One investigator found that in repetitive mental tasks the optimum rest period was two minutes for each hour of work or five minutes for each two hours. This is much less time than is required for recuperation from muscular work. A rest pause is known to increase feeling tone, but there is no strict relationship between feeling tone and output after a rest pause in either muscular or mental work. However, even in the laboratory, and particularly in the factory, the attitude of the worker toward both the task and the rest pause is very important. This factor is impossible to control perfectly, even in well devised laboratory experiments.

In regard to recuperation from the emotional strain associated with certain types of work, practically nothing is definitely known. The difficulties are the designing of appropriate tests and the individual differences in reaction to the emotional stimulus. Almost every one can talk on the basis of his individual experience.

The problem of recuperation is involved in the question of the effect of hours of work, day and night work, sleep, recreation, type of work, speed of work, Sunday

labor and overtime on feeling tone, output of work, absenteeism, accidents and morbidity. British investigations have provided utilitarian answers to these questions. That is, they have studied the effect of the factors mentioned on productivity. However, the exact physiologic or psychologic mechanisms involved have not been elucidated. In fact, such mechanisms may not be involved; the mechanisms may be entirely economical and sociological when moderate work is performed.

Some authors argue as follows: The average man does not work to his peak capacity; he sets his pace slow, so that a large margin of safety exists. As long as the health, nutrition and hygiene of the worker are good there is no reason why his natural pace should not be increased. There are persons who push themselves to capacity, and when their incentive comes from within health does not appear to be impaired. Given a fanatical desire for physical fitness, power and achievement, efficiency may be greatly increased. The recent accomplishments of Germany and Russia are cited, as well as those of athletes. The motive of the athlete is to excel. So-called chronic fatigue may be due to lack of such a desire. German and Soviet industry has successfully exploited all sorts of psychologic incentives to increase production. The idea that when a tired man is pushed further the fatigue is extreme and out of proportion to the exertion, or the "phenomenon of the last straw," has no evidence in its support.

On the contrary, there is evidence that indicates impairment of sensory thresholds when light monotonous and other types of work are performed for long hours daily. Also, a Sunday's or a day's rest returns the sensory functions to normal. And, further, there may be fatigue residues in the nervous system which are not now detectable by our physiologic and psychologic tests.

Although we cannot explain certain real phenomena, we must recognize their existence from the utilitarian point of view. We cannot adequately explain gravitation, yet we must recognize its existence and act accordingly. We do not know exactly how insulin acts in the body, yet we know that it is necessary for the health of the body. In the same way, we must recognize our individual experience and that of the British Industrial Health Board in regard to the effect of such factors as long hours and overtime on the impairment of productivity.

The British had just as much incentive to fight and to produce in 1914 and after Dunkirk as we have after Pearl Harbor. Yet the British government reported in the first world war and again as late as August 1940 that "the continuation of seven day working, with an average working week of between seventy and eighty hours, will quickly cause a rapid decrease in individual productivity owing to the abnormal strain." Hours have been lowered to forty-eight a week for women and for the majority of men to from fifty-four to sixty hours a week. In Germany, when the war started, the government by a series of decrees, removed the safeguards against overwork. On Jan. 1, 1940 the German government published a new decree, stating that the principle of the eight hour day would be observed and that nowhere could the working hours be extended beyond twelve hours. The decree stated that women and young persons could not work on night shifts and that the granting of holidays should be returned. The

reversal of policy was due to increased illness, absenteeism and accidents.

Whether the decrease in output with long hours is due to the accumulation of residual organic fatigue in the neuromuscular mechanisms, to a decline in excitatory value of the incentive or to the effects of the emotional strain associated with work of various sorts is unknown. In fact, this phenomenon of the effect of overtime may be similar to staleness in muscular work. Every one who has worked with the athlete or with the experimental subject doing maximal or submaximal work is acquainted with the phenomenon of staleness. As I have observed staleness, it is a complex phenomenon and cannot be attributed solely to a decline in incentive and feeling tone. The mechanisms involved, however, are uncertain. In mental work, from personal experience, staleness also occurs. In learning, a plateau is reached as in the output of muscular work, but the experiments on learning have not been extended sufficiently to bring out the phenomenon of staleness. Habits formed in the learning process or in learning to do work may alter the height of the plateau. In the output in factory work the same phenomenon is seen, and it is known as "stereotyped output." An old factory munitions crew will produce at a certain plateau. A new factory munitions crew, starting in a new environment, may reach a plateau twice as high as that attained by the old crew. And it appears that the plateau of the old crew cannot be materially elevated regardless of what is done. It appears that the crew has formed working habits that cannot be materially changed.

Some of the more important observations made by the British during the first world war and in this war may be summarized as follows:¹

1. An extension of the usual hours, except for a short period, does not yield a proportional increase in output.
2. After an extended period of overtime has been discontinued, weeks are required before the original steady output is attained.
3. More than sixty hours a week leads to increased lost time during work, increased absenteeism and sickness. One day's rest in seven is essential. British experience has shown fifty-six hours a week to be the optimum standard for men.
4. Organized or enforced rest periods, particularly with an opportunity to take food during the period, assist in the maintenance of a high output level.

It is of interest that the original investigations of the British health board were undertaken because of the increase in illness among munitions workers in the

1. These observations include:
 Hours of Work and Maximum Output, Great Britain Ministry of Labor, London, August 1940.
 Vernon, H. M.: Hours of Work in War Time, Industrial Welfare, December 1939; Sickness and Accidents Among Munitions Workers, *ibid.*, February 1940.
 Osborne, Ethel E.: The Output of Women Workers in Relation to Hours of Work in Shell Making, London, Industrial Fatigue Board, Bulletin 2, 1919.
 Kent, A. F. S.: Industrial Fatigue, Sessional Papers, House of Lords 53, Cd. 8056, 1914-1916; 16, Cd. 8335, 1916.
 Bridges, J. C.: Worker's Health in Wartime, Industrial Welfare, January 1940.
 Industrial Health Research Board, 18th annual report, London, 1938; Industrial Health in War Emergency, report 1, 1940.
 Bevin, William: Ministry of Labor Gazette, London, October 1940, p. 26.
 Industrial Health and Efficiency, Bulletin 249, United States Department of Labor, Bureau of Labor Statistics, 1919.
 Rees, J. R.: Psychological Problems of Industry at War, Industrial Welfare, June 1940.
 National Expenditure, editorial, Engineer 171: 62, 1941. Holiday.

last war. The same observations have been made under conditions of overtime in the present war. For example, among women the loss of time due to illness during a sixty-two hour week was twice that of a forty-four hour week. For men the same was true for a sixty-four hour week versus a fifty-four hour week. The overtime workers have usually complained of headaches, pains in the back, legs and feet, indigestion, palpitation and insomnia, and the consumption of alcoholic liquors among them has been observed to have increased considerably. The relation of overtime to accidents is not so decisively demonstrated. However, in one survey of 50,000 accidents occurring in four factories, the twelve hour day was associated with three times more accidents than during a ten hour day among women. A similar proportional excess was not observed for men, however.

No studies have been made to my knowledge of the effect of short vacations on productivity. An editorial in the *Engineer*² points out that even in the days of serfdom the overlords recognized that monotony is "soul destroying and the breeder of trouble" and that a period of relaxation is something that the laborer can look forward to with pleasurable anticipation. A short vacation may possibly be the solution to the problem of staleness.

SUMMARY

It may be said that work as performed by the average person cannot be reduced to a simple formula. The fatigue of the ordinary factory worker is too subtle to yield to the ordinary tests of the physiologist. The tests of the psychologists do not provide the answer. Neither has gotten to the basis of the mechanisms involved in so-called chronic industrial fatigue or of the decrease in productivity and increase in illness associated with long hours of light or moderate work. Social and economic conditions inside and outside the factory and office are very important. The psychologist and director of personnel has much to contribute. The physiologist and physician can contribute by giving advice regarding recreational programs, by dealing with the hazards of industry and by devoting attention to the health and nutrition of the worker. The physician since the time of Hippocrates has known the importance of rest and diet in the treatment of disease. He knows the value of rest, diet and recreation in the prevention of disease. We cannot win the war with work alone. Work demands rest, good food and wholesome recreation, which implies physical and mental fitness. The spirit of willingness and patriotism is essential, but it is not enough. Physical fitness is requisite for sustained effort and output.

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2. Holidays, editorial, *Engineer* 172: 104, 1941.

Novel Device for Collecting Air Samples in Inaccessible Places.—An apparatus has been designed for collecting remote air samples for chemical analysis in mine shafts and the like which cannot be entered (W. J. Fene, I. C. 7122, U. S. Bureau of Mines, Washington, D. C., 1940). An evacuated glass bulb is mounted together with a snap-type mousetrap on a board in such a way that, when the supporting cord is quickly jerked, the trap is sprung. This breaks off the short sealing tip on the bulb and thus allows the air sample to enter the bulb. Full details for the construction of the apparatus are given.

THE EFFECTS OF EXPOSURE TO TOLUENE IN INDUSTRY

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In the winter of 1940-1941 a survey of the airplane industry in New York State was made by the Division of Industrial Hygiene of the New York State Department of Labor. In the course of this survey it was found that large amounts of toluene were being used as a component of paints. Preliminary analyses of the air of the workrooms in which these paints were being used showed relatively high concentrations of toluene.

Use of toluene in this country has increased in the past few years. Whereas in 1930 there were 16,097,856 gallons produced, in 1939 the amount of toluene produced exceeded 24,000,000 gallons.¹ Toluene has gradually replaced benzene (benzol) in many industrial processes. In recent months, however, use of toluene has expanded enormously owing to the requirements of the defense program. The importance of this substance in national defense industries prompted the immediate reappraisal of its toxicity.

SCOPE OF STUDY

This study is intended to present data on the toxicity of toluene. It deals with the results of physical examinations of 106 painters in a large airplane factory in New York State.² These painters were exposed to toluene-containing paints. The study includes a careful evaluation of the working environment. The severity of the exposure of the workers examined was based on 92 samples of air.³ Thus an estimate of the physical conditions in terms of the severity of exposure was possible, and the results obtained constitute the contribution of this paper to the literature on toluene intoxication.

OCCUPATIONAL GROUPS EXAMINED

In order to evaluate the conditions found in the group exposed to toluene, a separate group of 430 fur workers (355 men and 75 women) not exposed to this substance was also examined. This constitutes the control group. Table 1 shows that the age distribution of the toluene-exposed workers corresponds closely to that of the group constituting the controls.

The toluene-exposed workers were representative of three distinct occupational subgroups, namely spray painters (51 men), dip painters (25 men) and brush painters (30 men). Two paint mixers are included with the brush painters since their exposure corresponded to

From the Division of Industrial Hygiene, New York State Department of Labor.

Read before the Industrial Hygiene Section of the American Public Health Association, Atlantic City, N. J., Oct. 16, 1941.

1. Reports of the United States Tariff Commission on synthetic organic chemicals, 1930 and 1939.

2. The cooperation given the authors by Dr. A. H. Garvin made this study possible.

3. All samples of air were obtained and analyzed in accordance with the technic developed by the United States Bureau of Mines (Yant, W. P.; Pearce, S. J., and Schrenk, H. H.: A Microcolorimetric Method for the Determination of Toluene, U. S. Bureau of Mines, Report of Investigation No. 3323, 1936) as modified (Burke, W. J.; Moskowitz, Samuel; Siegel, J.; Dolin, B. H., and Ford, C. B.: Industrial Air Analysis—A Description of Some of the Chemical Methods Employed in the Laboratory, Division of Industrial Hygiene, New York State Department of Labor, 1941) by the laboratory of the Division of Industrial Hygiene of the New York State Department of Labor.

that found for this occupational group. One spray booth maintenance man was included with the sprayers for similar reasons.

Spray painting was carried on in mechanically ventilated booths. In a few instances the painters were required to work on the main assembly floor where no

TABLE 1.—*Age Distribution of Toluene-Exposed Workers and Controls*

Age in Years	Control		Present Study Group	
	Number	Per Cent	Number	Per Cent
-19	12	2.8	5	4.7
20-29	113	26.3	42	39.6
30-39	125	29.1	26	24.5
40-49	98	22.8	21	19.8
50-59	71	16.5	11	10.4
60-69	11	2.5	1	1.0
Total	430	100.0	106	100.0

mechanical ventilation was provided. At these times they were provided with filter-type respirators. When spraying was necessary inside the fuselage of the airplanes, airline respirators were supplied to the men although they were not always used.

All employees examined in the factory studied worked an average of eight hours each day of a forty hour week. There were three shifts in the paint shops, but only those men whose exposure was for less than two weeks or for whom the exposure was found to be negligible, on the basis of analyses of the air, were omitted from this study. The latter comprise so-called touch-up men whose duties were to cover up blemishes and scratches of the partially completed or completed airplane assembly.

Samples of air were taken at the breathing level of the worker as his usual duties were performed, and on the basis of the analyses the average exposure to toluene was calculated on an eight hour basis, the result being a weighted concentration of exposure. The number of workers and their average exposure is presented in table 2, from which it will be observed that the average exposures ranged from 100 to 1,100 parts per million.

Of the 106 workers studied, the brush painters (30 men) had been exposed to benzene prior to four months before the beginning of the present study. A second group composed of 15 workers had been exposed to the inhalation of volatile solvents of unknown nature less than two years prior to the beginning of the present study. Deduction of these two groups leaves a group of 61 workers who were exposed to inhalation of toluene for a period of from two weeks to more than five years and who, so far as is known, had not been exposed to the inhalation of other toxic volatile solvents. This last group is hereinafter referred to as the uncomplicated exposure group.

Some few laboratory procedures were performed in the present study for which the fur workers did not provide a control. In those instances a control, if available, from another industrial group was utilized. When this has been done, mention will be made of the fact. However, hereafter when the term "control" is used it will denote the fur workers, unless mention is made of another source.

MATERIALS USED

The composition of the paints⁴ used are shown in table 3. It will be noted that the paints contained a

high percentage of toluene and certain other organic solvents. The preponderance of toluene in these paints, however, far exceeds the percentages of other volatile portions.

ENVIRONMENTAL CONDITIONS

All painting operations were performed in three areas: the large paint shop, the dip room and the spray booth located on the airplane assembly floor. The large paint shop was 217 by 100 feet and had a 25 foot ceiling. The spray booths in this room were of two types: one for small parts and the other for airplane fuselages and wings. The booths for small parts were constructed by partitioning off a bench-type booth 60 feet long into six parts. Each of these was 6½ feet high. The air velocity at the face of these booths was 90 feet per minute. The large booths, of which there were four, measured 12 feet by 12 feet and were about 40 feet deep. The average air velocity at the face of these booths was 90 feet per minute. The ventilation of all the spray booths was by means of propeller-type fans mounted in exhaust ducts above the booths.

The large paint room also housed the brush painters in one section of the room, about 20 feet from the nearest booth. The ventilation here was that provided by the exhaust of the spray booths.

The paint dip room was 86 feet by 22 feet with a 25 foot ceiling. There were three open paint troughs in this room the tops of which were 30 inches from the floor. These troughs were 18 feet long, 14 inches across and 12 inches deep. Two were located along opposite walls at the far end of the room. On the wall above each of these were stationary drying racks. The third trough was in the front part of the room. In back of this trough was a conveyor type drying rack.

An ineffective system of local exhaust was present on the troughs in the form of 1 inch wooden slots along the edges. These were connected to exhaust manifolds. The slots were all stopped up with dried paint. The ventilation in the paint dip room can, therefore, be considered as general ventilation. Air measurements made at all sources of air movement in and out of the room showed a total ventilation of 15,000 cubic feet of air per minute.

TABLE 2.—*Calculated Average Exposures to Toluene of All Workers Examined*

Toluene, Parts per Million	Workers in Present Study	
	Number	Per Cent
100.	30	28.3
150	5	4.7
200	21	19.9
250	2	1.9
300	8	7.6
350	2	1.9
400	11	10.4
500	10	9.1
600	4	3.8
700	5	4.7
800	5	4.7
900	1	0.9
1,000	1	0.9
1,100.	1	0.9
Total	106	100.0

The spray booth on the assembly floor was 12 feet by 8 feet and 15 feet deep. It was ventilated by the same type of fan as the booths in the large paint room. This booth had a crew of 3 men whose particular duty it was, in addition to spraying materials in the booth, to spray materials directly on the assembly floor without any mechanical ventilation.

⁴ The term "paint" is used in this presentation to include paints, lacquers, enamels and the like.

PHYSICAL EXAMINATIONS

The tabulation shows the form used for the history and physical examination. The data required by this form are of necessity brief in order to make the time of examination as short as possible and still give the desired information as to the toxicity of toluene.

Name	Sex	M	F	Age
Occupational History:				
Present: Duration	Yrs.	Mos.	Wks.	Wear respirator
				Type
				Full time
				Part time
Hours per week				
Previous: 1.				
2.				
3.				
Medical History:				
Constipation	Cramps		Headache	
Dyspnea on exertion			Dizziness	
Cough			Irritability	
Sore throat (frequent)			Wt. Now	1 Yr. ago
Weakness				
Easy fatigability				
Appetite				
Nausea				
Hemorrhage	Spontaneous	Traumatic	Skin	
	Nose		Petechiae	
	Mouth, Gums		Ecchymoses	
	Rectum			
Physical Examination:				
Blood pressure	Pulse rate			
Abdomen	Liver enlarged	Spleen enlarged		
Skin pallor	Cyanosis	Flush	Petechiae	Ecchymoses
Gums	Bleeding	Lead line		
Lymph glands (enlarged)	Axillary	Inguinal	Cervical	
Bony tenderness	Tibia	Sternum		
Weakness	Hands			

Form used for history and physical data of workers.

Extensive laboratory studies of the blood of exposed workers were made. This was done in view of the important blood changes reported in the literature with regard to the toxic effects of the aromatic hydrocarbons. The detailed studies made, their number and the method used are indicated in table 4.

Routine urine analyses were made on a large group of workers. The specific gravity determination of the urine was done by the usual method. Benedict's qualitative solution was used to test for sugar. The "heat and acetic acid" test was done for determination of albumin. Examinations for formed elements were done on sediments obtained by centrifugation.

In addition to these examinations an examination of the eyes was done on 26 selected men of the day shift. These men were chosen as having the greatest exposure to toluene. The examinations were done in a properly equipped dark room by a competent ophthalmologist.⁵ His examination in each case consisted of a history of ocular complaints, visual acuity, fundus, pupil and slit lamp investigation of the media of the eye. The results of these examinations, however, were negative and are not referred to elsewhere in this report.

RESULTS OF STUDY

Symptoms.—All the men examined were symptom free so far as the history form covers this subject.⁶

5. The ophthalmologic examinations were done by Dr. H. C. Goldberg of the Division of Workmen's Compensation of the New York State Department of Labor.

6. There were a few men among the dippers who complained of dermatitis. This is not given any further space in this report. Suffice it to say that hand dipping into a paint of high toluene content often produces dermatitis.

Physical Manifestations.—There were two outstanding conditions found by our physical examinations. These were the presence of perforated nasal septums in 5 workers and a high incidence of enlargement of the liver, the latter finding being observed in 32 men.

It is likely that the perforations of the nasal septum were associated with the large amounts of zinc chromate present in most of the paint being used. Incidentally, the blood Wassermann reactions of the men having perforated nasal septums were negative.

Enlargement of the Liver: Of the 106 men examined, it was found that 32 men, or 30.2 per cent, had enlargement of the liver as observed by palpation. The control group of 355 men had an incidence of this condition of 7 per cent. The enlargement varied from 1 to 5 fingerbreadths below the costal margin. The liver edges were all smooth, and in no case was the liver tender. Considering the previously defined uncomplicated exposure

TABLE 3.—Analysis of Paint Used by Painters*

	Percentage in Mixture
Spray painters	
Primer (75% of paint used):	
Zinc chromate.....	10.8
Magnesium silicate.....	0.7
Synthetic resin.....	12.8
Driers (lead and cobalt compounds)....	0.3
Xylene.....	5.8
Toluene.....	69.6
	100.0
Lacquer 1 (15% of paint used):	
Volatile portion:	
Ethyl alcohol.....	7.0
Ethyl acetate.....	18.0
Butyl alcohol.....	7.0
Butyl acetate.....	15.0
Petroleum naphtha.....	3.0
Toluene.....	50.0
	100.0
Nonvolatile:	
Nitrocellulose, synthetic resin, titanium oxide, ferrocyanide blue, iron oxide, carbon black, zinc oxide, etc. No lead compounds	
Lacquer 2 (10% of paint used):	
Volatile portion:	
Toluene.....	25.0
Xylene.....	33.0
Petroleum naphtha.....	42.0
	100.0
Nonvolatile:	
Resin, titanium oxide, zinc oxide, ultramarine blue, ferrocyanide blue, iron oxide, diatomaceous earth, amorphous silica, carbon black	
Brush painters	
Dope:	
Volatile portion:	
Ethyl acetate.....	16.5
Ethyl alcohol.....	3.2
Butyl acetate.....	16.5
Butyl alcohol.....	5.6
Petroleum naphtha.....	13.7
Toluene.....	44.5
	100.0
Nonvolatile:	
Nitrocellulose, glycol sebacate, aluminum, cadmium sulfide, barium sulfate	
Brush wash:	
Acetone.....	22.5
Ethyl alcohol.....	22.5
Toluene.....	55.0
	100.0

* Dip painters used a primer only of the same composition as given for spray painters.

group, it was noted that of the 61 men there were 13, or 21.4 per cent, with enlarged livers. This is three times the frequency of the control group.

Laboratory Findings.—Erythrocyte Counts: In table 5 the frequency distribution of the erythrocyte counts is shown. Employing 4.5 million erythrocytes per cubic

millimeter as a critical level, one finds that, whereas the control group had a percentage of 5.2 below this level, the toluene-exposed group showed this condition in 17 per cent of the men. Of the uncomplicated exposure group 8 men, or 13.1 per cent, had erythrocyte counts below this level.

TABLE 4—Number and Type of Blood Examinations Performed on Toluene-Exposed Workers

	Workers on Whom Examinations Were Performed	Method
Erythrocyte count	106	Standard
Leukocyte count	106	Standard
Hemoglobin	106	Newcomer (Todd and Sanford Clinical Diagnosis by Laboratory Methods, Philadelphia, W B Saunders Company, 1937)
Differential leukocyte count	103	Wright's stain; 200 cells counted
Reticulated erythrocytes	81	Cresyl blue counterstained with Wright's stain
Basophilic aggregation	73	McCord (McCord, Minster and Rehm: The Basophilic Aggregation Test in Lead Poisoning, J A M A 82:1730, 1924) modified by Vela Gonzales (Basophilic Aggregation Test, Ohio Dept of Health, Columbus, 1940)
Coagulation time	92	Capillary tube
Erythrocyte sedimentation rate	106	Wintrobe (Wintrobe and Landsberg: A Standardized Technique for the Blood Sedimentation Test, Am J M Sc 189:102, 1935)
Hematocrit	106	Wintrobe (The Direct Calculation of the Volume and Hemoglobin Content of the Erythrocyte, Am J Clin Path. 1:147, 1931)
Mean corpuscular volume	106	Wintrobe
Mean corpuscular hemoglobin	106	Wintrobe
Mean corpuscular hemoglobin concentration	106	Wintrobe
Wassermann test	104	Standard
Serum bilirubin	91	Ernst and Foister (Ueber die Bestimmung des Bilirubins, Klin Wchnschr 3:2386, 1924)
Erythrocyte fragility	83	Todd and Sanford (Clinical Diagnosis by Laboratory Methods, Philadelphia, W B Saunders Company, 1937)
Platelet count	92	Indirect

Hemoglobin: Table 6 shows the distribution of the hemoglobin levels. For the purpose of comparison there is presented in this table a series of eighty-one control hemoglobin measurements and also a series of hemoglobin measurements on 69 silicotic workers. The present data are presented in two groups, 106 workers in the group as a whole and the uncomplicated exposure group composed of 61 men. It should be pointed out here that all the hemoglobin determinations were made by the Newcomer method with the exception of the control group of 81 workers on whom the hemoglobin determinations were made by a photoelectric technic. The data on the silicotic workers are presented at this time to serve as an additional control; moreover because of the fact that the hemoglobin values of the silicotic workers were determined in the same manner as the toluene-exposed group.

In table 6 it is observed that whereas in the control group only 2.4 per cent have hemoglobin values of

16 Gm. or more per hundred cubic centimeters of blood, in the present study group 37.7 per cent had this level. Further, when one compares the hemoglobin values obtained in the present study with that obtained in a group of 75 men in various stages of silicosis in whom high values were anticipated, one finds a parallel incidence of values of 16 Gm. or more of hemoglobin. There were 37.9 per cent of the silicotic workers who had these high values. In the uncomplicated exposure group 18 men, or 29.5 per cent, had elevated values of hemoglobin.

Absolute Lymphocyte Count: Although the differential leukocyte counts of the toluene-exposed group showed no significant divergence from that of the control, the absolute lymphocyte count was abnormal. Table 7 shows the frequency distribution of the absolute lymphocyte counts. Considering the high figure of 5,000 lymphocytes per cubic millimeter as the critical level, it is observed that, whereas the control group has an incidence of 7.7 per cent having absolute lymphocyte counts above this level, the toluene-exposed group had this finding in 19.5 per cent of cases. Further, the uncomplicated exposure group had this finding in 20.4 per cent of the cases.

Mean Corpuscular Volume: The frequency distribution of the mean corpuscular volume values is shown

TABLE 5—Distribution of Erythrocyte Count in Toluene-Exposed Workers and Controls

Erythrocyte Counts in Millions	Control		Present Study		Uncomplicated Exposure Group	
	Number	Per Cent	Number	Per Cent	Number	Per Cent
3 00-3 49	0	0 0	1	0 9	0	0 0
3 50-3 99	3	0 9	2	1 9	0	0 0
4 00-4 49	15	4 3	15	14 1	8	13 1
4 50-4 99	112	32 4	38	35 9	24	39 4
5 00-5 49	141	40 8	36	34 0	21	34 4
5 50-5 99	49	14 2	12	11 3	8	13 1
6 00-6 49	21	6 0	2	1 9	0	0 0
6 50-6 99	5	1 4	0	0 0	0	0 0
Total	346	100 0	106	100 0	61	100 0

TABLE 6.—Distribution of Hemoglobin (Newcomer) in Toluene-Exposed Workers Contrasted with Findings in the Control Group and a Silicotic Group

Hemoglobin, Gm per 100 Cc	Control		Present Study		Uncomplicated Exposure Group		Silicotic Group	
	Number	Per Cent	Number	Per Cent	Number	Per Cent	Number	Per Cent
12 0-12 9	2	2 4	4	3 8	2	3 3	0	0 0
13 0-13 9	25	30 9	8	7 4	5	8 2	7	10 1
14 0-14 9	40	49 5	21	19 7	10	16 4	22	31 9
15 0-15 9	12	14 8	33	31 1	26	42 6	14	20 3
16 0-16 9	2	2 4	28	26 8	13	21 3	5	7 3
17 0-17 9	0	0 0	8	7 4	5	8 2	0	0 0
18 0-18 9	0	0 0	4	3 8	0	0 0	2	2 9
Total	81	100 0	106	100 0	61	100 0	69	100 0

in table 8. When the high value of 100 cubic microns is taken as the critical level, it is observed that whereas in the control group 7.2 per cent had mean corpuscular volume values of this level or higher, in the exposed group 23.6 per cent had such values and in the uncomplicated exposure group 21.3 per cent had such elevated levels.

7. Differential leukocyte counts were performed on 59 out of 106 in the uncomplicated exposure group.

Mean Corpuscular Hemoglobin: The frequency distribution of the values of the mean corpuscular hemoglobin is shown in table 9. The control in this instance was the same as that used for the hemoglobin values and carries the same limitations, since the mean corpuscular hemoglobin is derived from the hemoglobin value.⁸ It will be

TABLE 7.—*Absolute Lymphocyte Count in Toluene-Exposed Workers Contrasted with the Control Group*

Lymphocytes per Cu. Mm.	Control		Present Study		Uncomplicated Exposure Group	
	Number	Per Cent	Number	Per Cent	Number	Per Cent
1,000-1,999	34	8.6	5	4.8	4	6.8
2,000-2,999	120	30.4	23	22.3	17	28.8
3,000-3,999	145	36.8	31	30.1	13	22.0
4,000-4,999	65	16.5	24	23.3	13	22.0
5,000-5,999	17	4.3	15	14.6	9	15.3
6,000-6,999	9	2.3	3	2.9	2	3.4
7,000-7,999	2	0.5	1	1.0	0	0.0
8,000-8,999	1	0.2	1	1.0	1	1.7
9,000-9,999	0	0.0	0	0.0	0	0.0
10,000-10,999	1	0.2	0	0.0	0	0.0
11,000-11,999	1	0.2	0	0.0	0	0.0
Total	395	100.0	103	100.0	59	100.0

TABLE 8.—*Mean Corpuscular Volume in Toluene-Exposed Workers Contrasted with Findings in the Control Group*

Mean Corpuscular Volume in Cubic Microns	Control		Present Study		Uncomplicated Exposure Group	
	Number	Per Cent	Number	Per Cent	Number	Per Cent
70 - 74	1	0.9	0	0.0	0	0.0
75 - 79	9	8.1	6	5.7	2	3.3
80 - 84	13	11.7	15	14.1	8	13.1
85 - 89	30	27.1	12	11.3	8	13.1
90 - 94	25	22.5	29	27.4	19	31.2
95 - 99	25	22.5	19	17.9	11	18.0
100 - 104	7	6.3	13	12.3	6	9.8
105 - 109	0	0.0	8	7.5	6	9.8
110 - 114	1	0.9	4	3.8	1	1.7
115 - 119	0	0.0	0	0.0	0	0.0
Total	111	100.0	106	100.0	61	100.0

observed that whereas none of the control group had values of 35 micromicrograms for the mean corpuscular hemoglobin, 17.9 per cent of the present study group had such a value. The uncomplicated exposure group had such high values in 13.1 per cent of the cases.

Mean Corpuscular Hemoglobin Concentration: The frequency distribution of the mean corpuscular hemoglobin concentration is shown in table 10. The control in this instance was the same as that used for the hemoglobin values and carries the same limitations since the mean corpuscular hemoglobin concentration is derived from the hemoglobin value.⁹ It is observed that, whereas the control group had 2.5 per cent of cases with concentrations above 34 per cent, in the toluene-exposed group this concentration was observed in 39.7 per cent of the cases. The uncomplicated exposure group showed this concentration in 34.4 per cent of the men.

Other Hematologic Data: The remainder of the hematologic data was within normal limits. This included leukocyte counts, differential leukocyte counts, reticulated erythrocytes, basophilic aggregation estima-

tion, platelet count, erythrocyte sedimentation rate, coagulation time, hematocrit values, erythrocyte fragility and serum bilirubin. Of the 104 Wassermann tests performed only 2 gave positive results. The results of all these blood tests were striking, as some abnormalities were expected, particularly since some of the abnormalities have been regarded as indicative of intoxication. It is necessary to stress that the results relative to the tests mentioned were carefully made and checked with control data. In many instances two or more determinations were made.

Urinary Findings: No abnormality was noted in the specific gravity determinations. Of the 91 specimens of urine analyzed for albumin, 4, or 4.4 per cent, gave a positive result. Of the control group 5.4 per cent gave such a result. Only 1 of the 94 specimens examined for "sugar" was found positive. The control group showed glycosuria in 5.2 per cent of cases. In all cases the urinary sediment was essentially normal.

COMMENT

It appears from these data that the results of chronic exposure to toluene of the varying intensities noted produced some objective abnormalities but practically no symptoms. The absence of severe illness was a surprising revelation in view of the fact that the concentration of toluene in the inspired air reached the relatively high average level of 1,100 parts per million and that the period of exposure exceeded five years in many instances. In no instance was it felt necessary to

TABLE 9.—*Mean Corpuscular Hemoglobin in Toluene-Exposed Workers Contrasted with the Control Group*

Mean Corpuscular Hemoglobin in Micro- micrograms	Control		Present Study		Uncomplicated Exposure Group	
	Number	Per Cent	Number	Per Cent	Number	Per Cent
24 - 29	64	87.7	25	23.6	16	26.2
30 - 34	9	12.3	62	58.5	37	60.7
35 - 39	0	0.0	17	16.0	8	13.1
40 and over	0	0.0	2	1.9	0	0.0
Total	73	100.0	106	100.0	61	100.0

TABLE 10.—*Mean Corpuscular Hemoglobin Concentration in Toluene-Exposed Workers Contrasted with the Control Group*

Mean Corpuscular Hemoglobin Concentration, per Cent	Control		Present Study		Uncomplicated Exposure Group	
	Number	Per Cent	Number	Per Cent	Number	Per Cent
25 - 29	6	7.4	5	4.7	5	8.2
30 - 34	73	90.1	59	55.6	35	57.4
35 - 39	2	2.5	41	38.7	21	34.4
40 and over	0	0.0	1	1.0	0	0.0
Total	81	100.0	106	100.0	61	100.0

remove an exposed worker from his occupation because of the inhalation of toluene.

More specifically, there were observed certain abnormalities which, in the light of previous experience, must be interpreted as evidence of mild intoxication. These abnormalities were enlarged liver, mild depression of the erythrocyte level, elevation of mean cell volume, absolute lymphocytosis, elevation of the hemoglobin value,

8. Mean corpuscular hemoglobin = $\frac{\text{Grams hemoglobin/1,000 cc. of blood}}{\text{red blood cells in millions per cu. mm.}}$

9. Mean corpuscular hemoglobin concentration = $\frac{\text{grams hemoglobin in 100 cc.} \times 100}{\text{volume of packed red blood cells in 100 cc. of blood}}$

elevation of the mean corpuscular hemoglobin and elevation of the mean corpuscular hemoglobin concentration.

The finding of hepatomegaly is of especial importance, since such a finding as a result of exposure to toluene appears not to have been heretofore described.

TABLE 11.—*Relation of Length of Exposure and Intensity of Exposure to Abnormality of Erythrocyte Count (Below 4.50 Million) and Mean Corpuscular Volume (Above 99 Cubic Microns) Among Toluene-Exposed Workers*

Toluene, Parts per Million	To One Year		One to Five Years		Five Years and Over	
	Abnormal		Abnormal		Abnormal	
	Cases	Num- ber	Per Cent	Cases	Num- ber	Per Cent
100 - 150	3	0	0.0	2	0	0.0
200 - 400	12	2	16.6	13	3	23.0
500 - 1,100	15	4	26.7	5	2	40.0
				3	0	0.0

Since no correlation was found between enlargement of the liver and either clinical or laboratory evidence of disease, the possibility suggested itself that the enlargement of the liver might be compensatory in character rather than an indication of hepatic disease. The data collected in the present study, however, are considered insufficient to provide an answer to this question.

The decrease of the erythrocyte levels was of only a moderate degree. This is in strong contrast with observed effects of inhalation of benzene.¹⁰

TABLE 12.—*Abnormalities Observed Among the Sixty-One Workers in the Uncomplicated Exposure Group*

Case	Liver Enlarge- ment in "Fingers" Below Costal Margin	Erythrocyte Count Below 4.50 Million	Mean Corpus- cular Volume Above 99 Cubic Microns	Lymphocytosis
2	1			
7	0	4.26	106	5,525
26	0			5,733
27	0		103	...
28	0	4.35	110	5,980
30	0	4.32	106	5,250
31	0			6,392
42	0			...
51	4		...	...
53	4			...
54	0	4.43	106	5,014
57	0			5,617
58	1		103	...
62	0		108	...
75	4		109	...
83	4	4.47	103	...
99	4			5,085
101	2	...	...	...
102	0	...	102	...
104	4		...	...
107	0	4.24	106	...
113	2			...
116	0	4.38		...
119	3		...	...
121	3			...
123	4		105	5,290
126	0		...	5,868
128	0		...	6,420
129	0	4.26	101	...

The increase in absolute lymphocyte counts has frequently been described in exposures to various toxic substances in industry and requires no further comment

at this time. The same may be said about the elevation of mean corpuscular volume.¹¹

In an attempt to develop a correlation between length of exposure or intensity of exposure and the incidence of abnormal conditions there resulted the development of such small statistical categories that conclusions appeared to be unwarranted. However, in table 11 are presented the instances of abnormal mean corpuscular volume and decreased erythrocyte counts correlated with length of time of exposure and intensity of exposure considered together. Although some correlation was noted, a completely satisfactory correlation has not been found.

DIAGNOSIS OF CHRONIC TOLUENE INTOXICATION

Of the 61 persons in the uncomplicated exposure group there were 29 men, or 47.5 per cent, who had one or more abnormalities related to exposure to toluene. Table 12 lists these conditions. These persons are all believed to have evidence of early intoxication.

Of the results recorded in table 12 it will be noted that 22 of the 29 men possessed either elevated mean corpuscular volume, enlarged livers or both. Based on

TABLE 13.—*Total Leukocyte Counts*

Leukocyte Counts in Thousands	Control		Present Study	
	Number	Per Cent	Number	Per Cent
Less than 4.49	3	0.6	2	1.9
4.50 - 4.99	7	1.7	0	0.0
5.00 - 5.49	8	2.0	0	0.0
5.50 - 5.99	21	5.2	6	5.7
6.00 - 6.49	27	6.7	5	4.7
6.50 - 6.99	42	10.4	7	6.6
7.00 - 7.99	53	13.5	10	15.0
8.00 - 8.99	71	17.7	16	15.0
9.00 - 9.99	52	12.9	15	14.2
10.00 - 10.99	56	13.9	13	12.3
11.00 - 11.99	24	6.0	12	11.4
12.00 - 12.99	17	4.2	7	6.6
13.00 - 13.99	12	2.9	4	3.8
14.00 and over	3	0.8		
Total	403	100.0	106	100.0

this evidence, it is our belief that when there is industrial exposure to toluene, search of these two indexes at an early date will most likely reveal the presence or absence of the toxic effects of this substance.

Stress should be placed on the fact that leukopenia was not observed. There were 2 instances of depressed leukocyte counts found in the study (table 13). However, the fact that such cases in approximately equal numbers were found in the control group leads to the conclusion that the conditions of the experiment did not result in leukopenia.

CONCLUSIONS

Based on this study of 106 painters exposed to the inhalation of toluene of between 100 and 1,100 parts per million for periods of time ranging from two weeks to more than five years, it is concluded that:

1. Industrial exposure of human beings to toluene resulted in enlargement of the liver, macrocytosis, moderately decreased levels of erythrocyte counts and absolute lymphocytosis.
2. Such exposure did not result in leukopenia.
3. Early chronic toluene intoxication in man is best evidenced by hepatomegaly and macrocytosis.

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10. Greenburg, Leonard, Mayers, May R.; Goldwater, L. J., and Smith, Adelaide R. Benzene (Benzol) Poisoning in the Rotogravure Printing Industry in New York City, *J. Indust. Hyg. & Toxicol.* 21: 395 (Oct.) 1939. Heimann, Harry and Ford, C. B. Chronic Benzol Poisoning in the Plastics Industry, *New York State Indust. Bull.* 19: 224, 1940. Final Report of Committee on Benzol, National Safety Council, Chicago, 1926.

11. Greenberg, Leonard; Mayers, May R.; Goldwater, L. J.; Burke, W. J., and Moskowitz, Samuel. Health Hazards in the Manufacture of "Fused Collars". 1. Exposure to Ethylene Glycol Monomethyl Ether, *J. Indust. Hyg. & Toxicol.* 20: 134 (Feb.) 1938. Sterner, J. H. A Program for Detecting Possible Toxic Responses to a Varied Chemical Exposure, *New York State J. Med.* 41: 594 (March 15) 1941.

THE TOXICITY AND POTENTIAL
DANGERS OF TOLUENE

PRELIMINARY REPORT

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Toluene is used extensively as a solvent in the lacquer industry, and in the explosives industry it plays an important role as a starting material for trinitrotoluene. At present it is generally assumed that the maximal permissible concentration of toluene is about 200 parts per million parts of air. It appears, however, that there is little evidence to sustain the validity of this concentration as the maximal permissible limit. For this reason the following study was undertaken with the hope of establishing more definite data on which maximal permissible concentrations could be based.

Cole and Armstrong¹ established, by spectrophotometric determination, that the toluene used for this investigation was of a high degree of purity, containing not more than 0.01 per cent of benzene.

Animal experiments indicate that toluene is more irritant and, with lower concentrations, has a somewhat stronger narcotic action than benzene but that its effect on the blood picture and the blood-forming organs is considerably less severe and of a different type. Regarding its toxicity for man, an exact appraisal of its hazards is difficult, because only exceptionally is there an exclusive exposure to toluene, since in most industries it is frequently mixed with xylene and benzene, as previously described by one of us.²

In order to establish a maximal permissible concentration it was deemed most convenient to study first the acute effect of various concentrations on man and then follow these studies with continued exposure experiments on animals, concentrations being used which could be tolerated by man with eight hours' exposure or which gave evidence of some toxic effects.

THE EFFECTS ON HUMAN BEINGS OF EXPOSURE
TO VARIOUS CONCENTRATIONS OF TOLUENE

These experiments were carried out in a two compartment exposure chamber with a total capacity of 29,220 liters, the connecting door between the two compartments being wide open throughout the entire experiment so that the concentration of toluene in the two rooms was the same. Experiments showed that by evaporating toluene at a certain rate and mixing the vapors with the air circulating through these chambers the desired concentration could be established and maintained, while at the same time adequate ventilation and fairly constant room temperature and humidity could be provided. The concentration was controlled throughout

the experiment by interferometric determinations, and the addition of toluene was increased or decreased as required, as described by Armstrong.³ In this way it was possible to maintain concentrations of 50, 100, 200, 300, 400, 600 and 800 parts of toluene per million parts of air, with only minor fluctuations, by adding 0.8, 1.61, 3.22, 4.83, 6.44, 9.66 and 12.88 cc. of toluene a minute to an air current of 3,681 liters (130 cubic feet) a minute entering the chamber. The median temperature within the exposure chamber was 79 F., with 74 and 88 F. as extremes, and the relative humidity was 28 per cent in the median, with 20 and 40 per cent as extremes.

Three normal persons of different ages (between 35 and 53 years) and with different physical characteristics volunteered for these experiments. Before entering the chamber they underwent a medical inspection and their systolic and diastolic blood pressure, pulse rate, respira-

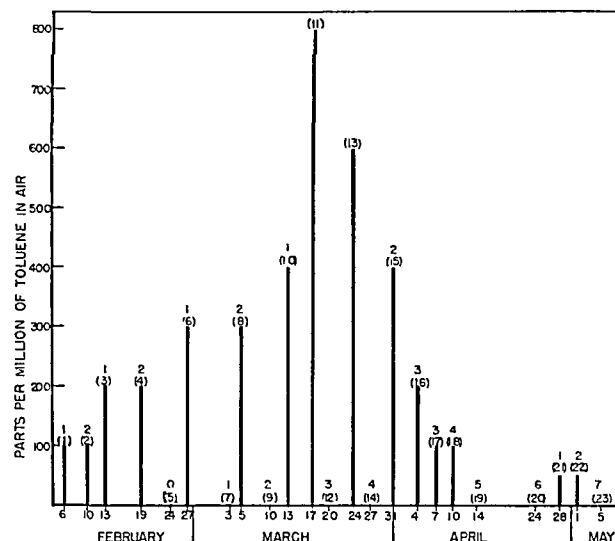


Chart 1.—The sequence of the different experiments. The figures in parentheses give the numbers of the individual experiments and those placed above them give the sequence of those experiments performed with equal concentrations.

tory rate and respiratory volume were measured, and in 2 subjects the eyeground was examined at the beginning and at the end of each exposure period, that is at 9 a. m., 11:45 a. m., 12:45 p. m. and about 4:30 p. m., the total exposure lasting, as a rule, eight hours with a half-hour intermission from 12 noon to 12:30 p. m. for lunch. In addition, the subjective findings were recorded and differential blood counts were made in the morning and in the afternoon. Samples of urine were collected during and at the end of the exposure and during the fourteen hours immediately following the experiment. These samples were analyzed for hippuric acid, in some instances for organic and inorganic sulfates, and for pathologic constituents such as sugar, albumin, acetone and occult blood. In several experiments 5-cc. of blood was withdrawn from the cubital vein of 2 of the subjects at the end of the eight hours' exposure for the purpose of determining the toluene level in the blood. During their sojourn in the chamber the subjects were occupied, as far as possible, with their usual routine work, in order to eliminate the effect of monotony and lack of occupation. Chart 1 illustrates

3. Armstrong, D. W.: Use of the Rayleigh-Jeans Interference Refractometer in Controlling Concentrations of Toluene in Air, *J. Optic. Soc. America*, to be published.

From the Division of Industrial Hygiene, National Institute of Health. Read before the Industrial Hygiene Session at the seventieth annual meeting of the American Public Health Association, Atlantic City, N. J., Oct. 16, 1941.

1. Cole, P. A., and Armstrong, D. W.: Analysis of Toluene and Benzene by Ultraviolet Absorption of Vapor Mixtures and the Determination of Concentration of Toluene in Air by the Use of the Rayleigh-Jeans Interference Refractometer, *J. Optic. Soc. America*, to be published. Armstrong, D. W., and Cole, P. A.: Use of the Rayleigh-Jeans Interference Refractometer in Controlling Concentrations of Organic Vapors in Air, *J. Indust. & Engin. Chem. (Anal. Ed.)*, October 1941.

2. von Oettingen, W. F.: Toxicity and Potential Dangers of Aliphatic and Print Pub. Health Bull. 255, U. S. Government 1940.

the sequence of the different exposures and the concentration of toluene in the air used in each experiment. It shows also that not more than two experiments were performed a week in order that there should be sufficient time in between for recovery.

With regard to changes of the blood picture, it appeared unlikely that the red blood cells would show any significant changes in these acute experiments, and for this and other reasons only variations of the white blood cell count and changes of the white blood cell picture were studied in these experiments. For these counts blood was withdrawn in the morning at the beginning of the exposure and in the afternoon toward its end. The daily counts showed some variations, but

in the course of the day or during exposure to toluene, as compared with control days.

It appears, therefore, that exposure to various concentrations of toluene, ranging from 50 to 800 parts per million under the conditions of these experiments over a period of eight weeks, as outlined in chart 1, does not produce any significant variations of the white blood cell picture.

Chart 2 illustrates the variations in the systolic blood pressure under the influence of various concentrations of toluene. With sojourn in the exposure chamber without exposure to toluene, all 3 subjects showed a fall of the systolic blood pressure during the morning and afternoon sessions which, in six experiments,

TABLE 1.—*Behavior of the White Blood Cells, With and Without Exposure to Toluene Vapors*

Leukocyte Count				Differential Count							
No. of Counts	Time	Range	Average	No. of Counts	Time	Lymphocytes	Poly morpho nuclears	Band Cells	Eosinophils	Basophils	Monocytes
SUBJECT A											
22	a m and p m	6.3-11.1	8.0	26	a m and p m	33.1	59.7	1.0	1.1	0.1	5.0
17	a m.	6.3-10.5	7.8	13	a m	30.0	62.0	1.4	1.0	0.0	5.0
18	p m	6.6-11.1	8.0	10	p m	37.0	55.7	1.1	1.0	0.5	4.6
Exposure Days											
22	a m and p m	6.3-10.5	7.9	8	a m	29.0	63.0	1.5	1.0	0.5	5.0
11	a m	6.3-10.5	7.8	8	p m	38.8	54.7	1.0	1.0	0.2	4.5
Control Days											
1, 6, 7	a m and p m	6.5-11.1	8.2	5	a m	29.4	62.0	1.4	1.0	0.2	6.0
	a m	6.5-9.5	7.5	5	p m	34.5	57.2	1.2	1.2	0.4	5.2
	p m	7.2-11.1	8.5								
SUBJECT B											
41	a m and p m	5.3-10.9	7.5	19	a m and p m	33.0	57.4	1.1	1.0	0.4	5.1
20	a m	5.3-9.0	7.4	20	a m	30.8	62.1	1.2	0.9	0.4	4.6
21	p m	5.9-10.9	7.4	19	p m	39.1	57.6	1.0	1.1	0.4	5.4
Exposure Days											
27	a m and p m	5.9-9.0	7.4	1, 12	a m	31.4	61.0	1.4	1.0	0.5	4.7
13	a m	6.1-8.5	7.6		p m	40.0	50.5	1.0	2.0	0.5	6.0
14	p m	5.9-9.0	7.3								
Control Days											
14, 7, 7	a m and p m	5.3-10.9	7.6	7	a m.	29.7	64.0	1.0	0.7	0.2	4.2
	a m	5.3-9.0	7.4	7	p m	35.0	55.7	1.0	0.6	0.2	4.5
	p m	6.5-10.9	7.7								
SUBJECT C											
19	a m and p m	7.6-12.4	10.1	19	a m and p m	32.8	58.1	1.3	2.6	0.0	5.0
9	a m	8.5-11.6	10.8	9	a m	27.0	65.1	1.5	1.8	0.0	4.1
10	p m	7.6-12.4	9.5	10	p m	38.0	52.2	1.2	3.1	0.0	5.3
Exposure Days											
12	a m and p m	8.5-12.4	10.4	6	a m.	27.2	65.7	1.5	2.0	0.0	4.0
6	a m	10.0-11.4	10.8	6	p m	39.0	51.0	1.2	3.0	0.5	5.5
6	p m	8.5-12.4	10.0								
Control Days											
7, 3, 4	a m and p m	7.6-11.8	9.5	3	a m.	26.0	65.0	2.0	2.0	0.0	5.0
	a m	8.5-11.8	10.6	4	p m	36.0	54.0	1.0	4.0	0.0	5.0
	p m	7.6-10.0	9.0								

these could in no way be correlated to the intensity of the exposure or to the duration of the entire study, and for this reason only the average counts on subjects A, B and C in general, during exposure days and on control days, are given in table 1.

This table shows that the average total leukocyte counts of all 3 subjects did not vary appreciably in the morning and afternoon samples, either during exposure or on control days. There was, as a rule, a slight increase of the lymphocytes toward the afternoon. This was paralleled by a corresponding decrease of the polymorphonuclear leukocytes. During exposure to toluene vapors these changes were slightly more noticeable but not sufficiently significant to be indicative of any toxic effect. Band cells, eosinophilic and basophilic cells and monocytes did not show any significant changes,

showed variations similar to those observed with different exposures to toluene. During the lunch period there was generally a tendency of the systolic blood pressure to increase. It should also be pointed out that the initial preexposure pressure showed considerable variation. With exposure to toluene the fall of the blood pressure was frequently more noticeable during the morning than during the afternoon, but the fluctuations never exceeded 18 mm. of mercury and are, therefore, within the limits observed in normal persons when active and when at rest, which, according to Wiggers,⁴ may vary between 15 and 30 mm. of mercury. Analysis of the data presented in chart 2 does not show any relation between the changes of the

4. Wiggers, C. J.: *Physiology in Health and Disease*, Philadelphia, Lea & Febiger, 1937.

systolic blood pressure and the concentration of toluene in air or the sequence of the experiments as illustrated in chart 1

Chart 3 illustrates the variations in the diastolic blood pressure. This was measured by recording the first disappearance of the pulse sound because it was felt that this could more readily be determined in the presence of the noise from fans than the baffling of the sound which is usually considered as an indication of the diastolic blood pressure. This is, according to Wiggers,⁴ 5 mm higher with the latter than with the former method and, accordingly, the true diastolic blood pressure is about 5 mm higher than that given in chart 3. As may be seen from this chart, the behavior of the diastolic blood pressure varied with different persons during the experimental period without exposure to toluene, and various concentrations of toluene had no definite effect within normal limits, that is between 70 and 90 mm of mercury.

Chart 4 illustrates the variations in the pulse pressure. It shows that the pulse pressure varied generally between 35 and 45 mm in 1 subject (A) and between 40 and 50 mm in the other 2 subjects or, after correction of the diastolic pressure, between 30 and 40 and

parts per million of toluene in air for eight hours (in the case of 800 parts per million, for three and two hours a day with a two hour rest period in between) has no definite effect on the respiration.

In respect to the effect of various concentrations of toluene in air on the nervous system, the observations

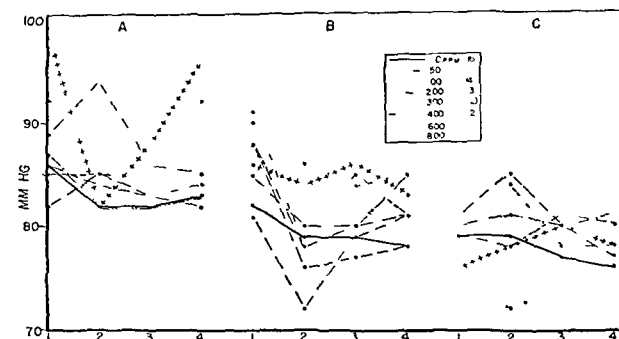


Chart 3—Behavior of the diastolic blood pressure of 3 normal persons during sojourn in the chamber with and without exposure to various concentrations of toluene in the air

refer mainly to subjective signs and symptoms which allow no accurate appraisal. For this reason they may be summarized as follows:

Sojourn in the exposure chamber for eight hours without inhalation of toluene vapors resulted in no complaints or objective symptoms except occasional, moderate tiredness toward the end of the experiment. This may be easily explained by lack of physical exercise, unfavorable illumination, monotonous noise (fans) and similar factors necessarily connected with an experiment of this type.

With exposure to 50 parts per million of toluene in air, A had no subjective complaints whereas B complained, toward the end of the experiment, of drowsiness and very mild headache. On discontinuation of the exposure he completely recovered and had no after-effects. In addition, at the end of the experiment the pupils of B were dilated and the accommodation to light was slightly impaired.

During exposure to 100 parts per million of toluene in air, 2 subjects (A and C) had no subjective complaints except for moderate fatigue and sleepiness and the third (B) complained, in addition, of a slight headache on one occasion. In contrast to these minor

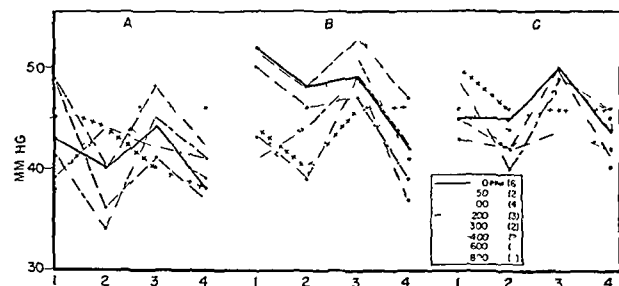


Chart 4—Behavior of the pulse pressure of 3 normal persons during sojourn in the chamber with and without exposure to various concentrations of toluene in the air

35 and 45 mm of mercury, respectively, without showing any relation to the intensity of the exposure.

Chart 5 illustrates the variations in the pulse rate. It shows that the pulse rate varied generally between normal limits, that it decreased during the person's sojourn in the chamber and that there is no relation between the intensity of the exposure and the changes of the pulse rate.

These experiments indicate, therefore, that exposure of normal subjects to concentrations of from 50 to 800 parts per million of toluene in air for eight hours (in the case of 800 parts per million, for three and two hours a day with a two hour rest period in between) has no definite effect on the circulation.

In order to study the effect of inhalation of toluene vapors on the respiration, the respiratory rate and minute volume were determined at the beginning and at the end of each exposure period. The average results for each concentration are summarized in chart 6.

This chart shows that the two functions vary within normal limits, sometimes in opposite directions, and there is no definite relation between such changes and the concentration of toluene to which the subjects were exposed.

These experiments indicate, therefore, that exposure of normal subjects to concentrations of from 50 to 800

results in experiments 1 and 2, subjects A and B, who were exposed to the same concentration on two occasions after having been exposed to concentrations of 800 parts per million and lower concentrations of toluene in air in the course of the preceding three weeks, as indicated in chart 1, complained of extreme fatigue

during and after exposure. One (A) also showed moderate incoordination, and the other (B) complained, in addition, of severe headache, muscular weakness, nervousness and paresthesias and also showed, on one occasion, dilatation of the pupils at the end of the exposure.

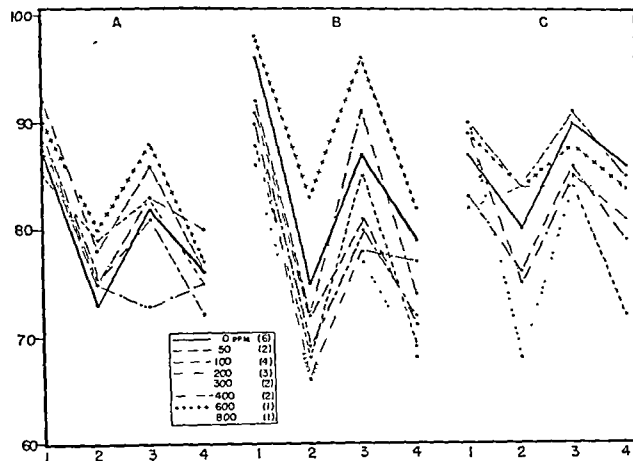


Chart 5.—Behavior of the pulse rate of 3 normal persons during sojourn in the chamber, with and without exposure to various concentrations of toluene in the air.

With exposure to 200 parts per million of toluene in air, all 3 subjects felt fatigued toward the end of the experiment; 2 (B and C) experienced on several occasions muscular weakness, confusion and paresthesias of the skin, 1 (B) complained repeatedly of headache and 1 (C) complained of nausea at the end of the exposure. Two subjects (B and C) showed impaired coordination. In several instances the pupils were moderately dilated, the accommodation to light was impaired and the eyeground was engorged at the end of the exposure. During the hours following the exposure all 3 subjects felt more or less fatigued and confused generally and repeatedly complained of moderate insomnia and restless sleep.

With exposure to 300 parts per million of toluene in air, all 3 subjects experienced more or less severe fatigue, 2 (B and C) complained of headache and 1 (B) complained of muscular weakness. The latter also showed signs of incoordination. Two subjects (B and C) showed slight pallor of the fundus, but it was not determined whether accommodation to light was impaired. Several hours following the exposure, all 3 subjects felt more or less fatigued and 1 (B) complained of insomnia during the following night.

With exposure to 400 parts per million of toluene in air, all 3 subjects felt more or less fatigued during the exposure and showed signs of mental confusion. Two (B and C) complained of headache, paresthesias of the skin and muscular weakness and their pupils were dilated and the eyegrounds were slightly pale. The accommodation was not tested. Several hours following the exposure all 3 subjects felt more or less fatigued; 1 (A) experienced paresthesias of the skin, 1 (B) complained of headache and 2 (A and C) complained of insomnia during the following night.

Exposure to 600 parts per million of toluene in air caused, at the end of three hours, extreme fatigue, mental confusion, exhilaration, nausea, headache and dizziness and, in 2 subjects (B and C), severe headache. At the end of the eight hours' exposure they showed definite mental confusion and complained of weakness,

dizziness and nausea. Objectively they showed considerable incoordination and staggering gait and, in several instances, the pupils were dilated, the accommodation to light was impaired and the optic disks were paler than normal. Several hours following the exposure all 3 subjects felt very tired and weak, nauseated and nervous and more or less confused; 2 (B and C) complained of severe headache and 2 (A and C) complained of insomnia. Fatigue and nervousness persisted on the following day.

Exposure to 800 parts per million of toluene in air rapidly resulted in severe fatigue, and after three hours' exposure all 3 subjects felt extremely nauseated, were very confused and showed lack of self control, considerable incoordination and staggering gait. In 1 subject (C) the accommodation of the pupils to light was strongly impaired, and in 2 subjects (B and C) the optic disk was paler than normal. All showed considerable after-effects lasting at least several days and characterized by severe nervousness, muscular fatigue and more or less severe insomnia.

These observations appear to indicate that exposure for eight hours to 200 parts per million of toluene in air produces definite impairment of certain nervous functions which, especially in hazardous operations, is liable to render persons thus affected dangerous to their own safety and to the safety of the operation. Higher concentrations become increasingly more dangerous in this respect, and exposure to concentrations of 600 and 800 parts per million should not be permitted for periods of three hours a day. At the present time we are not prepared to state after what duration of exposure such impairment of the nervous functions may result with different concentrations of toluene.

Attempts to correlate the intensity of the exposure with the odor of toluene were frustrated by the fact that the sensitivity of the olfactory nerve became rapidly paralyzed. With none of the concentrations tested was there any irritation of the mucous membranes other than a slight smarting of the eyes and nose.

One of the objectives of this study was to find a clinical test which would allow checking on previous

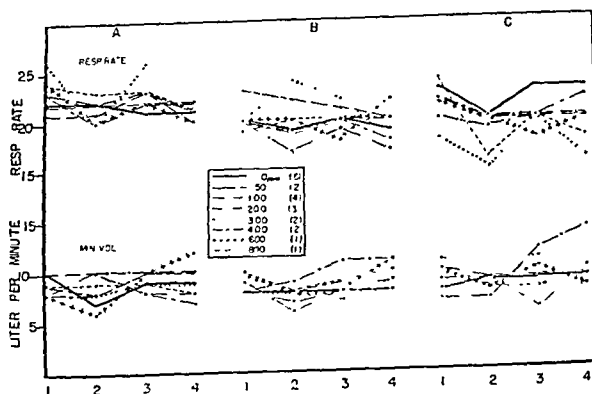


Chart 6.—Behavior of the respiratory rate and minute volume of 3 normal persons during sojourn in the chamber, with and without exposure to various concentrations of toluene in the air.

exposures to toluene. As it was shown by Schultzen and Naunyn⁵ and confirmed by numerous investigators that toluene is partly oxidized in the organism to benzoic acid and is excreted in conjugation with amino-acetic acid as hippuric acid, we decided to study the hippuric acid excretion as a possible criterion for exposure.

5. Schultzen, O., and Naunyn, Bernard: On the Behavior of Hydrocarbons in the Organism. *Arch. der Physiol.* 1867, p. 349.

The determination of hippuric acid in the urine was performed by Mr. P. J. Valaez of this laboratory with Quick's method, the modification described by Kraus and Dulkins⁶ in 1941 being used. In this determination the urine is acidulated with acetic acid until acid to litmus and is concentrated to a volume of 150 cc. by evaporation. To this concentrated urine sodium chloride is added, while heating and stirring, until a total of 45 Gm. has been added (30 Gm. per hundred cubic centimeters). The saturated solution is then cooled to room temperature and, while one stirs and scratches the sides of the beaker, sulfuric acid of the concentration 1:1 is added, drop by drop, until no further precipitate of hippuric acid is formed. Although the amount of sulfuric acid required for this purpose may vary with different samples of urine, from 2 to 5 or 6 cc. of sulfuric acid is usually sufficient. In order to insure complete precipitation, additional sulfuric acid is added to the filtrate, and in case no further precipitation occurs the precipitate is allowed to stand for at least fifteen minutes and is then filtered. Both precipitate and beaker are washed repeatedly with a 30 per cent solution of sodium chloride which is free of sulfate ions, until the washings give a negative test for sulfate ions. When the washing is completed, precipitate and filter are transferred to the beaker in which the original precipitation was made, from 75 to 100 cc. of distilled water is added and the mixture is heated until the precipitate is dissolved. The hot solution is then titrated with 0.5 normal sodium hydroxide against phenolphthalein as indicator, and from the amount of sodium hydroxide used the quantity of hippuric acid is calculated. Whereas with concentrations of more than 300 mg. of hippuric acid per 150 cc. of urine this method gives fairly accurate results, these become increasingly less exact with lower concentrations because comparatively large quantities escape the precipitation. With this procedure the normal hippuric acid excretion in the urine within twenty-four hours was determined as 403 mg. (average of 6 persons), which is somewhat lower than that frequently quoted in the literature, namely 0.7 Gm.

The results of these determinations are tabulated in table 2, which shows that the amount of hippuric acid excreted increased, roughly, with the intensity of the exposure. In judging the validity of such determinations one should remember that ingestion of benzoates, as for instance in foods preserved with sodium benzoate, is liable to give erroneous results and, in addition, it appears possible that other individual variations which will be investigated in a later section may influence the excretion of hippuric acid, so that in case such determinations should be used as criteria for exposure to toluene certain precautions and restrictions should be considered. These experiments show further that, with exposure to concentrations of 50 to 800 parts per million of toluene in air, the excretion of hippuric acid during the fourteen hours following the exposure increases with the intensity of the exposure, but additional determinations made on samples of urine voided during the day following the exposure indicate that with exposure to such concentrations the hippuric acid excretion is practically complete when fourteen hours have elapsed after the termination of the exposure.

It appears, therefore, that exposure to concentrations of 50 to 800 parts per million of toluene in air is asso-

ciated with and followed by an increased excretion of hippuric acid which is roughly parallel to the intensity of the exposure.

It is generally assumed that toluene is oxidized to benzoic acid and that no phenolic compounds are formed which could give rise to the excretion of ethereal sulfates in the urine, and Dakin⁷ found no evidence for the

TABLE 2.—Hippuric Acid Excretion in Man Following Exposures to Various Concentrations of Toluene

No. of Experiment	Subject	Up to 12 Noon	Up to 5 P. M.	Up to 10 P. M.	Up to 7 A. M.	Total Excretion in Mg.	Volume of Urine in Cc.
50 Parts per Million							
1 (21)	A	—	0	241	660	901	985
	B	0	0	0	0	0	1,175
2 (22)	A	0	0	428	0	428	835
	B	0	0	0	0	0	0
Average		0	0	332	0	332	
100 Parts per Million							
1 (1)	A	—	850	800	—	1,650	936
	B	—	560	L	L	>560	>980
	C	—	690	L	L	>690	>920
2 (2)	A	—	610	840	560	2,010	950
	B	0	765	0	0	765	1,222
	C	0	970	0	0	970	1,533
3 (17)	A	—	1,555	2,297	180	4,041	1,245
	B	379	240	0	0	619	2,225
	C	487	1,335	0	L	>1,822	>2,035
Average		487	715	781	0	1,268	
200 Parts per Million							
1 (3)	A	—	1,660	465	945	3,090	835
	B	540	1,475	0	L	>2,015	>1,290
	C	210	1,700	880	0	2,790	1,245
2 (4)	A	—	1,237	—	652	1,889	1,525
	B	0	1,335	0	0	1,335	2,210
	C	1,245	950	927	0	3,122	2,762
3 (10)	A	—	1,555	2,297	180	4,041	1,245
	B	379	240	L	L	>619	>920
	C	487	1,335	L	L	>1,822	>1,410
Average		487	1,594	1,141	0	2,621	
300 Parts per Million							
1 (6)	A	—	2,035	945	1,077	4,057	850
	B	617	1,842	248	L	>2,707	>1,640
	C	827	1,789	297	L	>2,913	>2,140
2 (8)	A	—	2,040	725	741	3,506	1,210
	B	312	1,520	L	L	>1,832	>2,605
Average		312	2,206	1,294	0	3,506	
400 Parts per Million							
7 (10)	A	—	2,428	1,146	1,073	5,079	1,645
	B	450	2,152	472	L	>3,063	>1,865
	C	—	360	1,040	L	>2,300	>1,985
2 (15)	A	1,016	1,918	1,161	1,264	5,359	950
	B	840	1,908	497	L	>3,251	>1,145
	C	743	2,405	875	1,800	5,823	2,610
Average		743	2,372	2,659	0	5,823	
600 Parts per Million							
1 (11)	A	—	3,800	2,100	1,503	6,933	1,209
	B	1,390	3,100	512	L	>4,921	>1,785
	C	659	2,757	1,448	1,455	6,309	3,044
Average		659	3,708	3,253	0	6,309	
800 Parts per Million *							
	A	—	2,609	L	1,230	>3,848	>1,005
	B	1,119	3,119	L	L	>4,238	>1,385
	C	527	1,466	1,894	2,278	6,165	2,040
Average		527	3,013	4,172	0	6,165	

* In this experiment the exposure lasted only three hours in the morning and two hours in the afternoon.

— = no urine voided; L = urine sample missed or lost; 0 = less hippuric acid than could be determined.

oxidation of benzoic acid to an aromatic oxy acid. But in view of the fact that the determination of the ethereal sulfates has been accepted as a criterion for exposure to benzene, which is, to a large extent, oxidized to phenol in the organism, it appeared desirable to see whether or not there was any significant reduction in the excretion of inorganic sulfates. Because it was impossible to run both determinations (hippuric acid and inorganic sulfate) in all samples, the latter was

6. Kraus, Ida, and Dulkins, Sol: The Determination of Hippuric Acid in Urine, *J. Lab. & Clin. Med.* 26: 729 (Jan.) 1941.

7. Dakin, H. D.: Fate of Sodium Benzoate in the Human Organism, *I. Biol. Chem.* 7: 103, 1909-1910.

determined only in samples which were sufficiently large to allow both determinations and which at the same time contained a large amount of hippuric acid.

Table 3 gives the results of these determinations and shows that there is no distinct reduction in the excretion of inorganic sulfates. These sulfates normally represent from 85 to 95 per cent of the total sulfates, but this ratio may be affected by changes of the bacterial flora in the intestinal tract and by the degree of putrefaction within the intestine.

It appears, therefore, that inhalation of toluene in concentrations of from 50 to 800 parts per million of air does not cause a decrease in the excretion of inorganic sulfates.

In addition, most of the samples of urine voided during and after the exposure were tested for the presence of acetone bodies by LeNoble's nitroprusside test, for albumin by the sulfosalicylic acid method and for occult blood by the benzidine test, all of which gave negative results. Analyses made for sugar by Benedict's qualitative test gave in the majority of samples from subject A and in about 50 per cent of the samples from subject B a very faint positive reaction which might be considered as indicating a trace of sugar. Such urines were usually very concentrated and contained a large amount of sediment, so that it appears questionable whether they were really indicative of sugar. In view of the observations of Dakin,⁷ who noted, after oral administration of large doses of sodium benzoate (5 to 10 Gm. a day) to normal persons, a slight increase of the normal glycuronic acid content of the urine and similar observations of Quick,⁸ Wagreich, Abrams and Harrow⁹ and others, it appears reasonable to assume that the reduction in question was not produced by sugar but by small quantities of glycuronic acid.

TABLE 3.—*Comparative Effect of Inhalation of Toluene Vapors on the Excretion of Hippuric Acid and Inorganic Sulfates*

Number of Experiment	Subject	Hippuric Acid in Milligrams	Per Cent of Inorganic Sulfate
300 Parts per Million			
1 (6)	A	2,025	86.9
	B	1,842	79.4
	C	1,780	90.4
2 (8)	A	2,040	84.0
	B	1,520	87.4
400 Parts per Million			
1 (10)	A	2,428	85.0
	B	2,152	96.2
600 Parts per Million			
1 (13)	A	3,300	79.5
	C	2,757	87.4
800 Parts per Million			
1 (11)	A	2,600	87.6
	B	1,466	79.1
	C	3,119	67.6

In order to find out whether or not the determination of toluene in blood may be utilized for appraisal of the intensity of the exposure, the following experiments were carried out:

From the cubital vein of 2 of the subjects (B and C) 5 cc. of blood was withdrawn at the end of the exposure and the toluene content was determined with the method

8. Quick, A. J.: The Study of Benzoic Acid Conjugation in the Dog With a Direct Quantitative Method for Hippuric Acid, *J. Biol. Chem.* 67: 477 (Feb.) 1926.
9. Wagreich, H.; Abrams, A., and Harrow, B.: Detoxification of Benzoic Acid by Glucuronic Acid in Humans: Rate of Detoxication, *Proc. Soc. Exper. Biol. & Med.* 45: 46 (Oct.) 1940.

of Yant, Pearce and Schrenk¹⁰ which was modified in several respects and on which Dr. Baernstein of our laboratory will report in the near future. The results of these determinations are summarized in table 4.

This table shows that the concentration of toluene in blood increases as its concentration in air increases. In order to find out to what extent these values could

TABLE 4.—*Concentrations of Toluene in Blood in Relation to Its Concentration in Air*

Concentration of Toluene in Air in Parts per Million	Date of Experiment	Number of Experiment	Concentration of Toluene in Blood, Mg./100 Cc.	Average Concentration in Blood, Mg./100 Cc.
200	2/13/41	3	B — 0.41	
	2/19/41	4	B — 0.43	
	4/ 4/41	16	B — 0.53	
	2/13/41	3	C — 0.66	
	2/19/41	4	C — 0.73	0.53
300	2/27/41	6	B — >0.64	
	3/ 5/41	8	B — 0.73	
	2/27/41	6	C — >0.60	>0.60
400	3/13/41	10	B — 0.94	
	3/31/41	15	B — 0.87	
	3/13/41	10	C — 1.17	0.96
600	3/24/41	13	B — >0.66	
	3/24/41	13	C — 0.95	>0.80
800	3/17/41	11	B — 2.64	
	3/17/41	11	C — 1.82	2.23

be duplicated in dogs, 3 dogs were exposed in experiment 6 simultaneously with the human subjects to concentrations of 300 parts per million of toluene in air, and the concentration of toluene in their blood was determined at the end of the experiment. This was found in 2 animals to be 0.74 and 0.79 mg. per hundred cubic centimeters of blood, and in the third, in which the sample was smaller than usual, 1.04 mg. per hundred cubic centimeters. These first two values check very well with the 0.73 mg. per hundred cubic centimeters which was found in the human beings in the same experiment. It appears, therefore, that dogs can be well utilized for such determinations.

These experiments indicate that the concentration of toluene in blood increases with its concentration in air and that concentrations of around 0.5 mg. per hundred cubic centimeters of blood may already cause definite impairment of certain nervous functions.

SUMMARY

Our studies indicate that single exposures of human beings for eight hours daily to concentrations of toluene ranging from 50 to 800 parts per million do not cause definite changes in the white blood cell picture, in the circulation or in the respiration. Inhalation for eight hours of concentrations of 200 parts per million causes slight but definite impairment of coordination and reaction time which is liable to render persons thus affected dangerous to their own safety and to the safety of the operation. With higher concentrations these effects become increasingly more severe, and with concentrations of 600 and 800 parts per million they may be observed after a few hours exposure.

Elimination of hippuric acid in the urine and concentration of toluene in the blood increase with the concentration of toluene in air. In contrast to experience with benzene, the ratio of inorganic sulfates in the urine is not noticeably affected by exposure to toluene.

[Since this preliminary report was presented, acute and continued animal experiments on dogs and rats have been carried out which confirm these findings and which will be published in the near future as a Public Health Service Bulletin.]

10. Yant, W. P., Pearce, S. J., and Schrenk, H. H.: A Microcolorimetric Method for the Determination of Toluene, Washington, D. C., Bureau of Mines Reports, Investigation, 3323, 1936.

EFFECT OF EXPOSURE TO KNOWN
CONCENTRATIONS OF CARBON
MONOXIDEA STUDY OF TRAFFIC OFFICERS STATIONED AT
THE HOLLAND TUNNEL FOR THIRTEEN YEARS

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The Public Health Service and the Bureau of Mines have recently had occasion to make a series of clinical and laboratory examinations which it is believed will be useful in defining the region of safe exposure to carbon monoxide. The Port of New York Authority requested that a group of one hundred and fifty-six officers who had been assigned to duty in the Holland Tunnel in 1927 be examined to find out whether or not injury to health may have resulted from occupational exposure to carbon monoxide. These officers had been examined in 1932 by Bureau of Mines and Public Health Service physicians, but, because the findings were negative as far as occupational disease was concerned, and because funds for publication were limited at that time, a report was not published.

The opportunities for investigating the effects of long-continued exposure to low concentrations of carbon monoxide are unusually favorable in this group of men. In the course of their duties, tunnel officers are unavoidably exposed to small quantities of carbon monoxide liberated in exhaust gas. The carbon monoxide concentration in the tunnel atmosphere has been recorded continuously by means of automatic recorders throughout the entire period of thirteen years and four months, and thus the average concentration to which the officers are exposed and the range of their exposure are known. In general, during periods of normally moving traffic when ten thousand to sixteen thousand vehicles move daily through a single tube, the average exposure of officers on duty in the tunnel is approximately 0.7 part of carbon monoxide per 10,000 parts of air (70 parts per million). The atmospheric concentration infrequently exceeds 2.0 parts per 10,000 and rarely exceeds 3.0 parts per 10,000 and then for only a few minutes at a time. During periods of holiday traffic the average exposure is slightly higher. On the day the Holland Tunnel had the heaviest traffic load it has carried since it has been open, the average carbon monoxide concentration throughout a twenty-four hour period was 0.86 part of carbon monoxide per 10,000 parts of air.

About half of these one hundred and fifty-six men are on regular tunnel duty. Their eight hour day is divided into four two hour periods in such a way that tunnel duty alternates with traffic duty on the plazas at the approaches and the exits of the tunnels. Tests showed that under ordinary conditions the carbon monoxide concentration prevailing at their posts on the streets is negligible. Other officers are stationed in emergency garages, which in function and equipment resemble fire department substations. No carbon

monoxide could be demonstrated in the air. Other officers were assigned to desk duty and still others to duty outdoors.

These officers were selected after a preemployment medical examination. This minimizes, if it does not completely eliminate, the possibility that preexisting disease may have complicated these findings. In the intervening years there has been very little labor turnover, so that most of the men who began work in the Holland Tunnel in 1927 are available for examination. Their salaries have enabled them to eat well, to live in adequate quarters and to provide themselves with medical and dental care as it became necessary. All of these background conditions remove complications that might otherwise interfere with the interpretation of these data.

Further information on the conditions of their employment and a more complete presentation of the medical findings may be found in a recent Public Health Bulletin.¹

The clinical examination, following the taking of the occupational history and the past and present medical history, was directed primarily at the cardiovascular and nervous systems. Laboratory procedures included an erythrocyte count, hemoglobin estimation by the Newcomer method, carbon monoxide-hemoglobin determinations by the Sendroy-Liu modification of the Van Slyke-Neill procedure, and tests for albumin and sugar in the urine. Teleoroentgenograms, 6 feet from target to film, were taken on all but the first thirty-two men, who were roentgenographed at 4 feet. When any abnormality of cardiac function was noted an electrocardiogram was made. Particular attention was devoted to getting a description of smoking habits, since this had a good deal of influence on the amount of carbon monoxide in the blood.

The officers took a friendly and intelligent interest in the study and were thoroughly cooperative throughout.

SYMPTOMS

Most of the officers were symptom free. When complaints of ill health were made they tended to be nonspecific and to occur singly. Generally they were not of such a degree of severity as to have prompted self medication or to have induced the subject to seek medical treatment. A number of officers volunteered the information that they experienced symptoms attributable to their work only at the end of hot, windless summer days, particularly when traffic had been unusually heavy. At such times toll collectors and officers on duty at street intersections reported that they often had throbbing headaches, frontal or bitemporal, sometimes accompanied by dizziness, anorexia, mild nausea and spots before their eyes. No complaints of headache were made at the time of the examinations in March 1941 or by any of the twenty toll collectors at the end of duty Sunday night, June 1, 1941, following a period of exceptionally heavy traffic.

Ten per cent of the officers gave a past history of headache associated with sinusitis, different in character from the headache that sometimes occurred in hot weather. No one complained of vomiting during or immediately after duty. Dyspepsia was an infrequent complaint. Two men gave a definite past history of gallbladder disease. Palpitation was reported by 8 per cent, cough by 3 per cent, weakness by 3 per cent,

From the Division of Industrial Hygiene, National Institute of Health, U. S. Public Health Service, Bethesda, Md. (Drs. Sievers and Edwards) and the U. S. Bureau of Mines Experiment Station, Pittsburgh (Drs. Murray and Schrenk).

1. Sievers, R. F.; Edwards, T. I., and Murray, A. L.: A Medical Study of Men Exposed to Measured Amounts of Carbon Monoxide in the Holland Tunnel for Thirteen Years, Pub. Health Bull., Washington, Government Printing Office, to be published.

drowsiness, usually in the summer, by 9 per cent, insomnia by 5 per cent and dyspnea of mild degree or occasional occurrence by 12 per cent. These do not seem to be unusual rates of incidence for symptoms of this degree in a population of men ranging in age from 32 to 51 years, averaging 41.

Ten officers reported that a diagnosis of peptic ulcer had been made at some time during the past eleven years by the family physician. Three of the men had scars that indicated operative treatment and several were still under active medicinal therapy. Only one man presented any objective signs that could be attributed to ulcers. He was 20 per cent underweight and had an erythrocyte count of 4.49 million cells per cubic millimeter and a hemoglobin content of 13.0 Gm. per hundred cubic centimeters. There seems to be no reason to believe that this represents an unusual finding for men of this age.²

PHYSICAL EXAMINATION

Cardiovascular Changes.—Since most types of heart disease early in their course are accompanied by enlargement of the heart, an effort was made to estimate the cardiac size of the traffic officers and compare them individually and as a group with other groups of men found or known to be free of heart disease. The best available method of determining heart size in the living subject is the measurement of the surface area of the heart shadow as noted on a teleoroentgenogram or by orthodiascopy. Hodges and Eyster³ developed a formula for the prediction of cardiac area of orthodiascograms in the posteroanterior view based on three factors—height, weight and age. To make this formula applicable, it is necessary to establish a correction factor for teleoroentgenograms because of the divergent x-rays. The correction factor of 0.916 was determined by making an x-ray exposure of a tin plate 8 cm. from the film to be comparable to the average distance of the greatest transverse diameter of the heart from the film.

After the correction factor had been applied, the measured heart area of each traffic officer was divided by the area predicted by the Hodges-Eyster formula and the resulting ratios were expressed as percentage deviation from predicted value. Comparison was then made with two other groups treated in the same way. One of these groups, a series of ninety-eight men selected by Eyster as free of heart disease, is taken from a report published in 1927.⁴ The third group of heart area measurements was obtained from chest films made at the last annual examination of employees of the Division of Industrial Hygiene, National Institute of Health. The average value and distribution of values of the three groups are in close agreement. Eyster's ninety-eight healthy subjects average 0.51 per cent more than the predicted heart area, the traffic officers are 0.17 per cent above the predicted average and the male personnel of the Division of Industrial Hygiene have heart measurements 0.75 per cent above the predicted value. As a result of these comparisons, it appears safe to conclude that the hearts of these men have not been damaged by conditions associated with their employment that would be reflected by roentgenographic study.

Three of the men presented electrocardiographic findings suggestive of myocardial damage. One man had had several coronary attacks, the second had auricular fibrillation and definite shortness of breath on exertion and the third had no symptoms, but coronary disease was suspected on the basis of electrocardiographic findings, heart enlargement and poor response to the exercise test.

The response of the heart to a vigorous exercise test uncovered several instances of cardiac impairment. An attempt to relate carbon monoxide hemoglobin values ranging from 0.5 to 13.1 per cent saturation with cardiac response to exercise failed to demonstrate any significant degree of correlation. As a group the post-exercise pulse (two minutes after exercise) was slightly less than the preexercise rate, which may be taken as an indication of a good cardiac reserve. A small number of men, most of them overweight, had pulse rates that failed to return within a reasonable rate of the resting pulse rate.

Further examination of the cardiac system did not reveal any unusual group findings. The average pulse rate of 80.6 beats per minute compares favorably with the average noted in several previous field studies. A resting heart rate of 100 or more beats per minute was found in 7 per cent of the men. The blood pressure readings brought forth average systolic values for each age group that were 10 mm. of mercury lower than found on other studies,⁵ and no apparent change in average diastolic pressure. The lower systolic value was thought to be related in part to taking more than one blood pressure reading and recording the lowest value, whereas in previous studies only one reading was ordinarily made on each man.

Hypertension, defined as a systolic pressure of 150 mm. of mercury or more, was noted in only five officers. The highest systolic reading was 164 mm. of mercury.

Tentative diagnosis of heart disease on the basis of a number of findings such as irregular pulse, elevated blood pressure, enlarged heart and abnormal electrocardiographic tracings was established on four officers. Coronary heart disease with slight myocardial damage was demonstrated in the electrocardiographic tracings of three officers. The diagnosis of hypertensive heart disease was made on the fourth officer. The findings obtained during this study were too inconclusive in a fifth man to establish a diagnosis of adhesive pericarditis, which could only be suspected. Only one man who had a history of previous coronary attacks was partially incapacitated for general activities and has been placed on light duty, which he performs without difficulty.

Nondisabling cases of this degree are not uncommon in employed populations, and this rate of incidence is, if anything, lower than usual.

Neurologic Changes.—Careful observations were made for tremors, spasticity, rigidity, response to vibratory sensation, coordination tests and tendon reflexes. A fine tremor of the outstretched hand, mild in degree, was observed in 12.5 per cent and to a moderate degree in 5 per cent of the officers examined. Two per cent of the officers had a coarse tremor of moderate degree. The tremors were associated in one instance with mild hyperthyroidism and with the effects of a recent heavy alcoholic bout in another case. A third officer had a

2. Jennison, Janette: Observations Made on a Group of Employees with Duodenal Ulcer, *Am. J. M. Sc.* 196: 654-662 (Nov.) 1938.
3. Hodges, P. C., and Eyster, J. A. E.: Estimation of Cardiac Area in Man, *Am. J. Roentgenol.* 12: 252-265 (Sept.) 1924.
4. Eyster, J. A. E.: Size of Heart in Normal and in Organic Heart Disease, *Radiology* 8: 300-306 (April) 1927.

5. Britten, R. H., and Thompson, L. R.: A Health Study of Ten Thousand Male Industrial Workers, *Statistical Analysis of Surveys in Ten Industries*, Pub. Health Bull. 162, Washington Government Printing Office, 1926.

poorly regulated diabetic condition which may have accounted for some of his tremor. No true cases of intention tremor were noted. Based on the experience of past field studies, these figures are slightly lower than those previously reported. The response to vibratory sensation produced by a tuning fork was normal in each instance. No neurologic disturbances could be demonstrated by abnormal tendon reflexes. The coordination tests, such as finger to finger and finger to nose, were properly executed by each subject. Spasticities and rigidities of muscles, speech disturbances and abnormal gait were not found.

An excellent psychomotor test for judging the integrity of the nervous system was available in the form of marksmanship records obtained annually on the pistol range. There was no significant difference in the scores of ninety tunnel officers who had worked longer than thirteen years as compared with one hundred and twenty-four officers on duty for shorter periods of time. The subjects noted with tremors of moderate degree, either fine or coarse, had an average pistol score significantly less than the pistol score of the entire group. Men with slight tremors had as good a pistol score on the average as other officers. The Port Authority pistol team composed of seven officers, six of whom had tunnel duty, has finished in first or second place in formal competition in a league made up of pistol teams representing police organizations in northern New Jersey every year since 1935.

Other Findings.—The results of the visual acuity test of the traffic officers compare favorably with data of two other groups of employed men of similar age distribution.⁶ A number of the officers presented evidence of eye irritation manifested as simple scleral injection of a mild degree. This irritation may have been due to dust exposure, indicated by layers of dust deposited on the margin of the eyelids.

The remainder of the physical examination covering such organs as the ear, nose, throat and chest, including roentgenograms of the lung fields, yielded no unusual abnormalities. The subjects as a group were noticeably overweight, even after allowances were made for constitution type, for these men were selected on the basis of sturdy physique. There is no evidence as yet that conditions associated with obesity, such as degenerative diseases of the heart and kidney, have had any deleterious effects on these men.

LABORATORY EXAMINATION

The amount of hemoglobin combined with carbon monoxide is directly related to smoking habits. The effects of smoking without other carbon monoxide exposure had the following mean values for percentage carbon monoxide-hemoglobin saturation: (a) for twenty-one nonsmokers 1.71, a figure which is in good agreement with the corresponding value of 1.5 per cent reported by Hanson and Hastings⁷ for a similar group; (b) for thirty-nine smokers averaging less than one pack of cigarettes daily 4.10, and (c) for twenty-one smokers averaging a pack of cigarettes or more a day 5.35.

The carbon monoxide-hemoglobin values of the officers examined in March 1941 during the time of this study varied from 0.5 to 13.1 per cent saturation. The highest values were obtained on subjects who smoked and were exposed to heavy traffic on the upgrade section of the tunnel, where atmospheric carbon monoxide readings averaged slightly more than 100 parts per million for a two hour period. (Blood samples were taken shortly after the first or second two hour tour of duty in the tunnel.) Nonsmokers with this degree of exposure had carbon monoxide-hemoglobin values that were proportionately less. It was observed that the levels of carbon monoxide in the blood of nonsmoking traffic officers stationed in the tunnel during two hours of average exposure fell within the same range of carbon monoxide-hemoglobin values found in cigarette smokers with no occupational exposure to carbon monoxide.

The average erythrocyte count of these men was 5.2 million cells per cubic millimeters, a value in close agreement with the average found by Osgood on one hundred and thirty-seven medical students.⁸ The hemoglobin content of the blood averaged 14.38 Gm. per hundred cubic centimeters (Newcomer method). Previous field studies using the same instrument gave similar hemoglobin values. No association of erythrocyte counts or hemoglobin values with carbon monoxide-hemoglobin levels was found.

Glycosuria and albuminuria did not exceed the expected ratios of incidence.

EXPOSURES IN INDUSTRY

These observations on men exposed daily for thirteen years to an average concentration of 0.7 part of carbon monoxide per 10,000 parts of air in their working environment are of added importance because this is about as great an exposure as has so far been observed in most shops, mills and workrooms where carbon monoxide is known to escape into the breathing zone. Careless use of gasoline engines, of course, can readily create greater carbon monoxide concentrations.

In recent months Public Health Service engineers have been engaged in a large scale industrial hygiene survey of arsenals and industrial establishments engaged in manufacturing operations related to national defense. Their assignment was to visit every workroom, study the materials and equipment and make whatever measurements were necessary to find out whether or not a health hazard existed. In the course of their work they encountered almost every major manufacturing process carried on in light and in heavy industry and made measurements with a MSA carbon monoxide indicator in every instance in which there was reason to suspect the presence of carbon monoxide in the atmosphere. In a small proportion of the workrooms they visited, measurable amounts of carbon monoxide were present in the breathing zone of the workers, but except for places where internal combustion engines were being operated the concentrations were well within the limits that prevail in the Holland Tunnel. Further information and references to the literature on the subject have been presented elsewhere.¹

This should not be interpreted to mean that precautions against acute exposure can be relaxed. On the contrary, the control methods developed during planning

6. Jones, B. F.; Flinn, R. H.; Hammond, E. C.; Wulfeck, W. H.; Lee, R. H.; Donahue, D. D.; Specht, H.; Baernstein, H. D.; Channell, R. C.; Hough, J. W.; Jones, R. R.; and Sayers, R. R.: *Fatigue and Hours of Service of Interstate Truck Drivers*, Pub. Health Bull. 265, Washington, Government Printing Office, 1941. Neal, P. A.; Dreessen, W. C.; Edwards, T. I.; Reinhart, W. H.; Webster, S. H.; Castberg, H. C.; and Fairhall, L. T.: *A Study of the Effect of Lead Arsenate Exposure on Orchardists and Consumers of Sprayed Fruit*, Pub. Health Bull. 267, Washington, Government Printing Office, 1941.

7. Hanson, H. B., and Hastings, A. B.: *The Effect of Smoking on the Carbon Monoxide Content of Blood*, J. A. M. A. 100:1481 (May 13) 1933.

8. Osgood, E. E.: *Hemoglobin, Color Index, Saturation Index and Volume Index Standards; Redeterminations Based on Findings in One Hundred and Thirty-Seven Healthy Young Men*, Arch. Int. Med. 37: 685-706 (May) 1926.

and operation of the Holland Tunnel should be extended to every situation in which human beings are exposed to carbon monoxide, particularly wherever internal combustion engines are operated in enclosed places.

SUMMARY

Examination of a group of one hundred and fifty-six Holland Tunnel traffic officers exposed throughout a period of thirteen years to an occupational carbon monoxide exposure averaging 0.7 part of carbon monoxide per 10,000 parts of air did not reveal any evidence of injury to health attributable to carbon monoxide exposure.

CONSERVATION OF HEARING IN INDUSTRY

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The consideration of this subject necessitates answers to two questions: 1. Is it generally recognized that hearing losses result from certain industrial hazards? 2. Can anything be done and is anything being done to prevent them?

The first of these must be answered in a qualified negative. Some hazards to hearing are recognized and preventive measures, either direct or indirect, are being taken to eliminate them. Other hazards, because of the peculiar type of hearing loss which they cause, are not being recognized and no concerted action toward conservation has been taken.

Recently an employer was asked what his reaction would be if some one asked permission to test the hearing of his employees. He replied that he preferred to let sleeping dogs lie. A locomotive engineer was asked if he would invite some members of his union to come to the laboratory for hearing tests. No charge was to be made and the results were to be confidential. None appeared for the tests. The medical officer in charge of a certain corps area, when asked if he knew of any studies relating to deafness from gunfire, replied that he knew of only one, that from the Office of the Surgeon General at the close of World War I. (Guild's¹ report of 1918 with reference to one hundred and forty studies had not come to his notice.) Officials of an aviation corporation, after being shown that five out of eight of their pilots had definite hearing losses, decided not to send other pilots for tests.

Why does this attitude exist? It appears that employers are not aware of or ignore these facts for fear that additional legal regulations will be invoked and questions of compensation arise. Laborers also evade the issue for fear it will bring about loss of employment or adversely affect tenure. It appears that employers and employees maintain the attitude of the traditional ostrich with his head buried in the sand. The subject appears to be a two edged sword which will cut in both directions, and the attitude toward deafness in industry has changed but little with our industrial development.

This pessimistic attitude may well be abandoned in the discussion before this group of scientists. The fact that the program committee assigned this subject indicates that some of its members believe certain industrial hazards do have a deleterious effect on hearing and that

something ought to be done about it. If any action is considered, an examination of some of the conditions of employment and their relationship to hearing defects is necessary for a more complete understanding of the problems involved. The rights of both employer and employee deserve equal and fair consideration.

First, but not necessarily the most important of the conditions which may be analyzed, are those occupations in which it is necessary for workmen to be exposed to extreme and rapid variations in the temperature without adequate protection. If these exposures result in upper respiratory infections, otologists will generally agree that they may adversely affect the hearing. If suppurative otitis media results, careful otologic treatment may prevent measurable hearing losses, but repeated infections of this kind are almost certain to result in defective hearing. It is also claimed by some that, if a mild form of hyperplastic otitis media exists, repeated upper respiratory infections tend to lower the level of hearing still more.

In some occupations active steps have been taken to eliminate sudden extreme temperature changes. In the new Diesels the engineers are in enclosed compartments which are as comfortable as one's own living room. Modern automatic stokers and oil burners now furnish power to drive our ships, and the man with the shovel in the boiler room is a thing of the past. The enclosed cabins of our modern airplanes to a limited extent protect the ears of passengers and pilot—if the windows are not opened—both from temperature changes and from the terrific motor and propeller noises.

No one would be so naive as to think that these innovations were brought about because of a desire to preserve hearing. Nevertheless, they do prevent hearing losses to a greater or lesser degree.

In addition to the acute otitis media which is so often an accompaniment of upper respiratory infections, certain flight surgeons (e. g. Armstrong) have described a new form of middle ear involvement called aero otitis media, which is thought to be peculiar to aviators. It also may cause hearing losses. Since it lowers the aviators' efficiency or incapacitates them for a limited time, its prevention is a vital problem in our present crisis. We can be sure that hearing losses from aero otitis media will be prevented, not particularly to conserve the hearing, but because it is necessary to keep the aviator fit for his job.

Hearing losses occur at times in laborers who are subjected to sudden wide variations in atmospheric pressure. It has repeatedly been reported in caisson workers. Figure 1 shows the audiograms of 2 patients whose hearing losses resulted from the accidental lowering of atmospheric pressures while they were engaged in sewer and bridge construction. Since this type of deafness is but one manifestation of a generalized systemic involvement, its prevention has been brought about, except in accidental cases, through the safety regulations which are now being rigidly enforced in this industry. The use of compressed air machinery and explosives in caisson construction add another hazard to hearing which is not generally recognized. This will be discussed in detail in a later section.

Unfortunately, caisson workers are not the only ones who are at times subjected to extremes of atmospheric pressure. Rather indefinite reports have reached the public that effects somewhat similar to those encountered in caisson workers have been found among aviators who fly our modern speedy pursuit ships and bombers. If this is true it is certain that preventive

From the Northwestern University School of Speech.
Read before the Fourth Annual Congress on Industrial Health,
Chicago, Jan. 13, 1942.
1. Guild, S. R.: Otopathies of War, Internat. A. M. Museums,
Bull. 7, 1918, p. 225.

measures are being taken in response to the new immediate demands for physical efficiency in fliers.

These few brief examples have been cited to show that steps are being taken in certain industries which tend to conserve hearing. These steps are not primarily for this purpose and in them conservation of hearing is

attention of the public and the medical profession. He⁵ stated "The influence of noise which is at times deafening has been little studied . . . it seems wise . . . to introduce so important a subject."

Although blacksmithing as an occupation has almost disappeared, modern industry is becoming more noisy. The compressed air hammer has replaced the manually operated sledge. Gasoline and steam engines with explosive exhausts are universally employed. Presses for forming metal plates are larger than ever. The nation with the most powerful explosive is in a strategic position. The ear has remained unchanged and is more susceptible to these traumatic influences.

The 1926 edition of Politzer's⁶ textbook and the opinions of other teachers of that day seem to have created an impasse concerning the diagnosis of deafness from noise. Politzer wrote "These concussions of the internal ear produced either by direct violence to the head or by detonations, in which the external meatus and the membrana tympani present a normal appearance, are absolutely incapable of being judged from the medicolegal standpoint. The reasons for this are: (1) it cannot be positively proved that the paralysis of the auditory nerve is due to the presumed injury, and (2) even if the traumatic violence be established, it cannot be positively determined whether the paralysis of the acoustic nerve has not existed prior to the time of injury." In the same volume Politzer weakened his stand by stating that "one therefore observes in locksmiths, blacksmiths, boilermakers, mechanics, iron-turners, file-makers, plate-makers, tinkers, engineers, stokers, as well as persons working in noisy machine

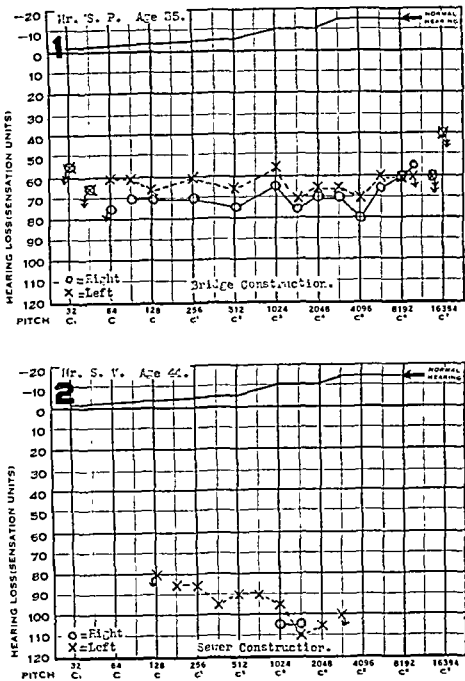
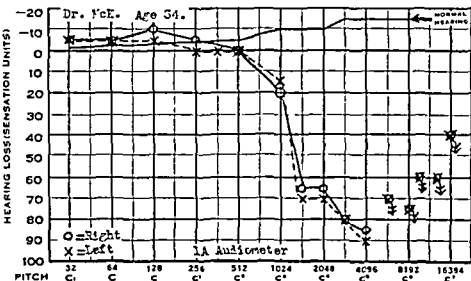


Fig. 1.—Audiograms showing bilateral hearing loss in two caisson workers. The small arrows indicate that certain tones were not heard at the maximum intensity of the 1 A Western Electric audiometer.

a by-product of other preventive measures. In none is it evident that conservation of hearing was of first importance. Only isolated efforts are aimed directly at preventing hearing losses.

It has been known for many years that certain industrial hazards have a deleterious effect on hearing without producing other measurable systemic changes. Fosbroke² called attention to deafness among blacksmiths more than one hundred years ago. Those engaged in blacksmithing were but a small part of the total population, and medical textbooks of that time paid little attention to Fosbroke's observation. Knowledge of the anatomy, physiology and pathology, as well as therapy, of the ear was very limited. Otology had not been thought of as a medical specialty. It remained for Barr³ and his contemporaries of the 1880's to diagnose excessive noise as the cause of deafness among boilermakers and foundrymen, and the otologic textbooks at the turn of the century gave "boilermakers' deafness" as a separate clinical entity. Bezold and Siebenmann's⁴ textbook of 1908 states that "the most frequent injury to the inner ear is that from excessive noise, the acoustic trauma." However, the points for differential diagnosis between this and other forms of perceptive type deafness were not established, and little or nothing was done to eliminate this hazard to hearing. In fact, Gilbert, a medical inspector of factories in Belgium, attempted in 1921 to bring this subject to the



RIGHT EAR				HEARING GRADE	LEFT EAR			
1	2	3	4		5	6	7	8
54	56	85		30	48	55	48	
41	68	83		27	23	54	63	
84	63	42		24	66	88	83	
51	14	18		21	41	42	32	
78	34	61		18	81	23	85	
23	12	35		15	68	85	63	
32	31	32		12	21	86	18	
11	63	44		9	15	64	24	
48	88	53		8	43	58	88	
38	81	66		5	XX	32	15	
86	86	XX		0	XX	1X	XX	
51	12	45	←	1A Audiometer	XX	XX	XX	

Fig. 2.—Tests made with the 4 A (phonograph) audiometer show no loss in the right ear for spoken numbers and only 3 units loss in the left. The record of the same man with the 1 A audiometer shows bilateral loss for tones above 1.024 double vibration.

shops, an increasing diminution in hearing power and persistent subjective noises which increase in intensity through excessive irritation of the auditory nerve."

2. Fosbroke, J.: Pathology and Treatment of Deafness, *Lancet* 1: 645, 1830-1831.
3. Barr, Thomas: Injurious Effects of Loud Sounds on the Hearing of Boilermakers and Others Who Work Amid Noisy Surroundings, *Proc. Glasgow Phil. Soc.* 17: 223, 1886.
4. Bezold, F., and Siebenmann, F.: Textbook of Otology, translated by Jacques Holinger, Chicago, E. H. Colegrove Company, 1908, p. 280.

5. Gilbert, D. J.: Influence of Industrial Noises, *J. Ind. Hyg.* 3: 264, 1921-1922.
6. Politzer, Adam: Diseases of the Ear, Philadelphia, Lea & Febiger, 1926.

More accurate hearing tests which became possible with the development of modern audiometers did not immediately result in a clearer description of the deafness caused by excessive noise. Studies that I⁷ made in 1937 and the study by Larson⁸ in 1938, that by Dickson, Ewing and Littler⁹ in 1939 and that most

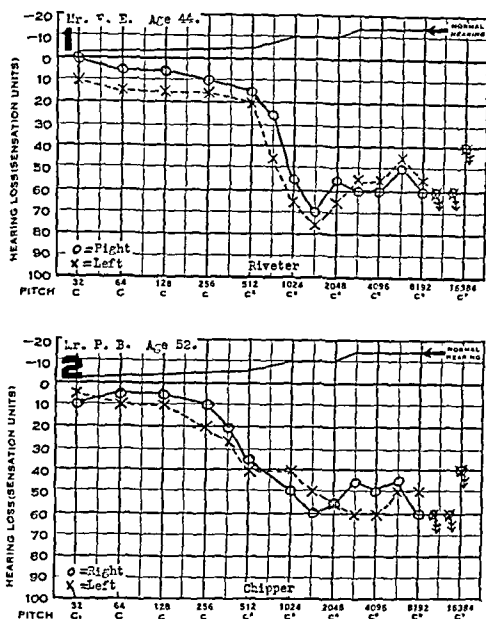


Fig. 3.—Audiograms of a riveter and a foundry "chipper" which show losses at 512 and 1,024 double vibrations. Both had considerable difficulty in hearing conversation.

recently by Perlman¹⁰ in 1941 give a more accurate description of traumatic deafness and it is now possible in a great many cases to distinguish it from that having other causation. The study by Dixon, Ewing and Littler was especially important. In this study young men whose hearing had previously been tested were exposed to measured airplane noises for definite periods of time and the tests were repeated after exposure. They found which men were susceptible to this noise, the amount of temporary damage, the rate of recovery, how much exposure was required to produce permanent hearing loss and what could be done to prevent it in those who must of necessity follow this occupation.

It is true that others mentioned had previously described this type of deafness, but no one had been able to establish the cause and effect relationship so definitely. Politzer's statements are no longer true. We can now by actual tests determine whether a workman's hearing is normal before he enters an occupation and by tests repeated at desired intervals determine whether the hazards of that industry do cause hearing losses. The problem is no longer closed by tradition.

The nature of this particular type of loss may account for its lack of recognition in the past. Dickson, Ewing and Littler described some of its peculiarities as follows: "A loss of high tones is noted in persons exposed to aeroplane engine noise if the ears are not protected" and "No deafness amounting to disability is complained of unless the speech frequencies become involved." A case which is apropos is shown in figure 2, the record

of a postgraduate medical student. He had been attending classes for several weeks and neither he nor his instructors were aware that he had any hearing loss. The defect was discovered in routine tests. The record shows a bilateral loss for high tones with no loss at all for tones below 1,024 double vibrations. His hearing for spoken voice when tested with a phonographic audiometer (4 A Western Electric) showed no loss at all in the right ear and only 3 decibels loss in the left. (In group schoolroom tests with this instrument, losses of 6 decibels or less are usually considered of no practical significance.) Had this young man been interviewed by a prospective employer who depended on conversational voice to eliminate candidates who were hard of hearing, no loss would have been detected. It may be said that for his professional work he had no handicap at all and that losses of this extent need receive no consideration as far as industry is concerned. It will be shown later that this is not necessarily true.

This man, in addition to having been an aerial observer, was a machine gunner in the National Guard. It is obvious that no proof as to the cause and effect relationship has been established.

Dickson, Ewing and Littler's statement that "no deafness is complained of unless the speech frequencies become involved" is illustrated in this case. According to Miller¹¹ the vowel sounds are made up of complex patterns of tones with frequencies between 300 and 3,000 double vibrations. The frequency of most of the consonant sounds is somewhat higher. This man, who had marked hearing loss for tones above 2,048 double vibrations, had no apparent difficulty in understanding conversation. This experience is common to all who use the telephone. People think they hear well over the telephone until they attempt to speak a proper name and discover that it must be spelled before it can be understood. This is because the high tones of the voice which carry the distinguishing characteristics of the consonant sounds are carried inefficiently by the telephone.

Figure 3 shows the audiograms of two men whose acuity for tones between 512 and 1,024 double vibrations was considerably diminished. Both of them had considerable difficulty in understanding conversation. The first man had been a "chipper" in a foundry for twenty years and the second a boilermaker-riveter for

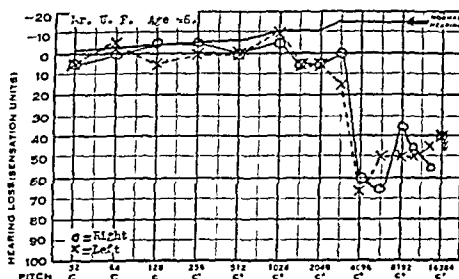


Fig. 4.—Audiogram of an instrument maker who had no difficulty in hearing conversation

ten years. The hearing loss in each case was a very definite handicap, since speech frequencies were affected.

Again there is no proof that a cause and effect relationship exists, but it is not difficult to understand why Politzer, working with less accurate equipment for determining the acuity of hearing, made the statement

7. Bunch, C. C.: Diagnosis of Occupational or Traumatic Deafness: A Historical and Audiometric Study, *Laryngoscope* 47: 615 (Sept.) 1937.
8. Larson, B.: Investigation of Professional Deafness in Shipyard and Machine Factory Labourers, *Acta oto-laryng.*, 1939, supp. 36, p. 3.
9. Dickson, E. D. D.; Ewing, A. W. G., and Littler, T. S.: Effects of Aeroplane Noise on Auditory Acuity of Aviators, *J. Laryng. & Otol* 54: 531 (Sept.) 1939.
10. Perlman, H. B.: Acoustic Trauma in Man, *Arch. Otolaryng.* 34: 429 (Sept.) 1941.

11. Miller, D. C.: *The Science of Musical Sounds*, New York, Macmillan Company, 1934, p. 215 ff.

that it is impossible to judge these cases from the medicolegal standpoint.

Losses in acuity for tones higher than 3,000 double vibrations are at times somewhat incapacitating. Figure 4 shows the record of an instrument maker. None of his associates noted that he was hard of hearing. He

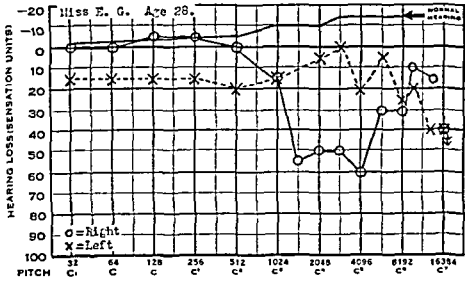


Fig. 5.—Audiogram of a telephone operator who was unable to understand numbers when she wore the receiver at her right ear.

was an expert watch maker. It was necessary for him to use a small megaphone at his ear when he listened to the high pitch sound of a watch tick. The audiogram shows that his hearing loss is confined to high tones. He had served in World War I in both the infantry and the artillery.

Figure 5 is the record of a young woman who had been a telephone operator for ten years. She heard ordinary conversation without difficulty. Recently her supervisor had received complaints that she was giving her patrons the wrong numbers. She wore the receiver at her right ear because the left was slightly defective from otitis media, which occurred early in life. In this case the loss was a serious handicap. Since she could no longer perform her work satisfactorily she was

Information Obtained from Audiograms

Dry Cotton Packs

	Pitch	32	64	128	256	512	1024	2048	4096	8192	16384
R. N. Rt. ear	20	20	25	20	25	10	25	45	30	40	25
R. N. Lt. ear	5	5	10	20	5	15	30	40	15	40	45
E. F. Rt. ear	0	5	0	0	5	10	30	15	0	15	20
E. F. Lt. ear	0	5	0	0	10	10	25	10	20	10	25
Total.....	25	35	35	40	45	45	110	110	65	105	125
Average....	6%	8%	8%	10	11%	11%	27%	27%	18%	21%	38%

Cotton-Petrolatum Packs

	Pitch	32	64	128	256	512	1024	2048	4096	8192	16384
R. N. Rt. ear	25	25	30	25	35	30	40	40	30	35	25
R. N. Lt. ear	45	40	45	50	45	40	45	40	20	45	45
E. F. Rt. ear	25	30	25	20	25	25	25	30	5	25	35
E. F. Lt. ear	20	20	15	20	35	35	35	35	30	25	35
Total.....	115	115	115	115	140	130	145	145	85	130	140
Average....	28%	28%	28%	28%	35	32%	36%	36%	21%	32%	35

placed on furlough, and her discharge was being considered. She attributed her hearing loss to the extremely loud noises carried to her ear by the telephone.

Further examination of the physical factors which are involved has been made possible by the development of the noise level meter. Commissions in several cities have used these instruments successfully in noise abatement campaigns. Figure 6 (copied with permission of the editors of *Electronics*) is a diagram showing the amount of noise found in various conditions measured by a noise level meter. This shows that boiler makers are subjected to about 90 decibels of noise. It is known that boiler making produces hearing losses. It is known also that, if heavy street traffic at a noise level of 80

decibels produced hearing losses, most of our city dwellers would be hard of hearing. The boundary line between noises which cause hearing losses and those which do not lies between 80 and 90 decibels. All that is necessary to prevent hearing losses from noises at a level of 90 decibels is to insulate the acoustic apparatus or deaden the sound at its source by approximately 10 decibels.

Figure 7 shows the audiograms of two young men whose hearing in the sound proof room (with a 1A Western Electric audiometer) is indicated by the records in connected circles. The external canals were blocked with dry cotton packs and the tests repeated. The records for the second condition are given in crosses. The dry cotton plugs caused very little lowering of the thresholds for low tones but in each case blocked out the high tones much more effectively. If the noise under suspicion is made up of low frequencies, dry cotton packs will give only 5 or 10 decibels protection. The records of connected dots were made similarly except that the canals were closed with petrolatum saturated cotton packs.

The data from these audiograms are arranged in the table. The average loss produced by dry cotton packs for tones below 512 double vibrations was 10 decibels or less. The thresholds for higher frequencies were lowered from 11 to 38 decibels. The petrolatum-cotton packs made an obstruction for both low and high tones consistently greater than that secured with dry cotton packs.

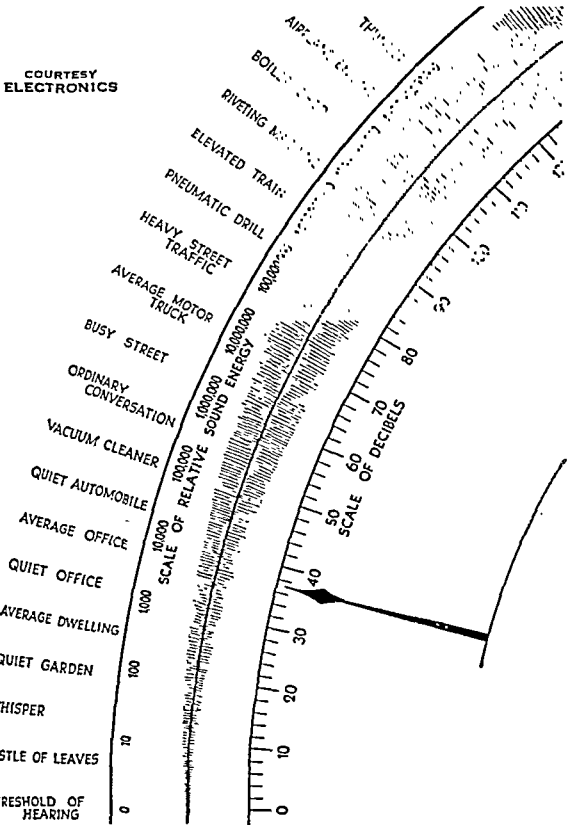


Fig. 6.—Scale of a noise level meter showing the amount of noise under various conditions.

These four records are perhaps an insufficient number from which to compute averages. They show considerable variation. E. F. blocked his right ear much more effectively than his left. This should be a warning in

industrial work where adequate protection of this kind is desired. Instructions to workmen requesting them to pack their ears may not give the desired result. These two men packed their ears as well as they could. They were interested in the experiment and were intelligent listeners. If adequate maximum protection is desired

ears. He used no protective device. The second was a police chauffeur who was a "crack" shot and a member of the police pistol team. It is significant that he was right handed and that the right ear has the greater hearing loss. The audiograms of both men show relatively good hearing for low tones with the sudden sharp

drop in acuity for high tones which has consistently been found in cases of traumatic deafness.

Hard, smooth walls, ceilings and floors make excellent sound reflectors. Shooting galleries should be set up in open spaces where nothing can prevent the rapid dissipation of the acoustic energy of the explosions. If conditions make this impossible, the walls, ceilings and floors of the gallery should be adequately treated with sound absorbing materials to minimize reflection and keep the reverberation time as low as possible. Figure 9 shows a shooting gallery with walls and ceilings treated in this manner. This picture appeared in a cosmopolitan daily, so it is evident that in

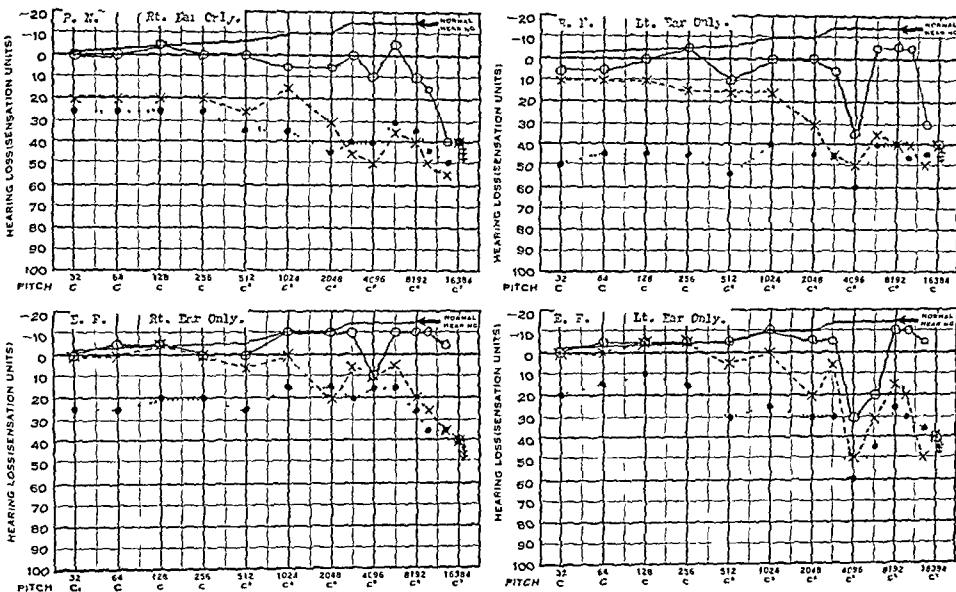


Fig. 7.—Audiograms of the right and left ears of two graduate students, first with the external canals open (records of circles), then with the canals closed with dry cotton packs (records of crosses) and finally with the canals closed with petrolatum saturated cotton packs (records of heavy dots)

routinely, some more efficient type of protective device should be available.

If the noise of an airplane motor is at a level of 110 decibels, as shown in figure 6, blocking out 20 decibels of this noise with dry cotton packs would leave a level of 90 decibels, that of the noise in a boiler shop. Petrolatum-cotton plugs would, if properly inserted, lower the noise level to a point which is theoretically no longer potentially dangerous to hearing.

Perlman¹⁰ reported from experiments on human listeners that "sounds of low frequency produced less acoustic trauma than those of high frequency." The tonal spectrum of the noise of an airplane is not available for analysis here. It is probably made up of tones having a wide range of frequencies. If the high component tones of this noise come at a level of 110 decibels the petrolatum-cotton plugs, which, according to the table, obstruct tones above 512 double vibrations by 30 to 35 decibels, should prove effective in lowering the level of these high tones to a point which is no longer harmful to the perceptive mechanism. While the effectiveness of the blocking by petrolatum-cotton packs is less for low than for high tones, packs may be effective in preventing deafness, for, according to Perlman, low tones have less traumatic effect than high.

It is mandatory in certain cities that policemen shall be efficient in the use of side arms. A minimum of practice and frequent tests in a shooting gallery are prescribed for efficiency ratings. Some of these marksmen have found that the noise of firearms in shooting galleries is unpleasant or painful to the ears and have learned to minimize these effects by plugging their ears with empty cartridges. Figure 8 shows the audiograms of two policemen with definite hearing losses which may have resulted from pistol fire. The first one reported that at his last gallery practice the effects of each shot were as if a sharp instrument were being stuck in his

some cities steps are being taken to conserve the hearing of policemen while they are at target practice. No enclosed shooting gallery without adequate acoustic treatment should be licensed in any city.

No thought is given to reverberation of sound in caissons. Walls of steel, concrete and stone make excel-

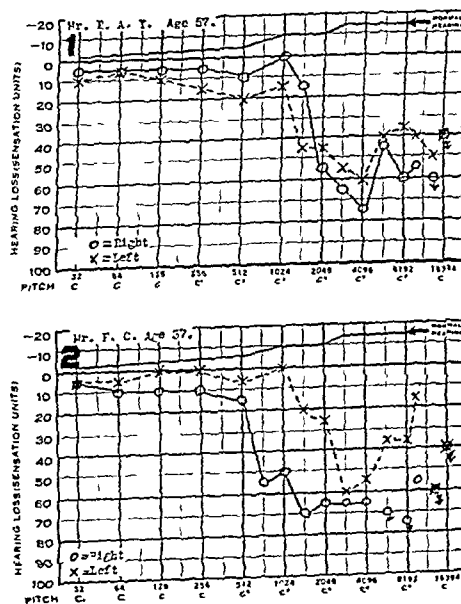


Fig. 8.—Audiograms of two police officers who practiced revolver shooting in a station target gallery.

lent reflectors. The noises of blasting and compressed air machinery under these conditions are, theoretically at least, a terrific hazard to hearing, not only because of reverberations, but because of the change of the speed of sound in air at increased pressure. Caisson

workers are therefore subjected to two hazards, either of which may adversely affect hearing.

Industries in peace and in war differ chiefly in the intensity and direction of effort. In war the hazards to hearing are intensified if for no other reason than the increase in personnel. In figure 10, 1 is the audio-

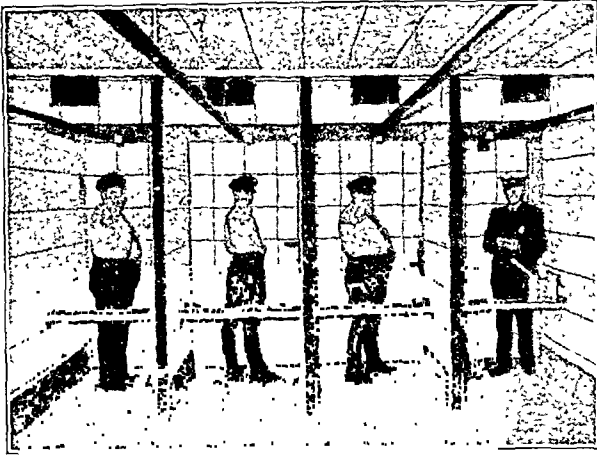


Fig. 9.—Newspaper illustration showing policemen at target practice in a gallery with acoustically treated walls and ceilings.

gram of a young farmer who drove his tractor, which he described as a "noisy old Case," all day long during the plowing and threshing seasons. This record is similar to 2, the audiogram of a World War I whippet tank driver and machine gunner. The latter stated that, when the tank was moving, conversation between the driver and the observer, who stood directly behind him, was impossible because of the terrible din. This was accentuated when the machine gun was fired. The increased mechanization of our modern armies and increased firing power of modern armament will result in greater acoustic trauma in 1942 than in 1918.

The sacrifice of the hearing of those in the battle front will be a small price to pay for the preservation of our democracy, but it is too great a price to pay if, through ignorance and indifference, protective methods are not used whenever and wherever necessary. Dr. J. B. Costen,¹² who was attached to a medical unit in France during World War I, reported that on the day following an intense barrage a large number of soldiers reported at the hospital with their external auditory canals filled with dirt. On inquiry he was told that when a barrage started these men pressed handfuls of mud into their ears: a fairly efficient, if not entirely sanitary, method of protection. In the summer of 1940, during the intense bombing of London, the government issued ear plugs to the metropolitan population in order, it was stated, to prevent rupture of the drum membranes and to shut out the noise of explosions and make necessary sleep possible. Doubtless these ear plugs were more or less effective in preventing hearing losses.

The action of our universal compulsory education laws are such that industry must recruit workmen from those who attend our public and private schools. School administrators in many states have learned that hearing tests aid in adjusting the child's educational program, and some states require that all children in the public schools shall be tested each year. Results show that from 5 to 7 per cent of the school children have mea-

surable hearing defects. Some but not all of these receive treatment which alleviates the condition. Others go into industry with definite hearing losses which may or may not become progressive. It is only fair to both employee and employer to know of hearing losses which exist at the beginning of employment. Such tests would protect both, and conditions which are harmful could be determined by repeated tests and suitable protective devices installed. For the employer, the tests would provide adequate insurance against employees who claim damages for losses which existed prior to the time of employment. In addition, such tests conducted over a long period of time would reveal much scientific information concerning otologic problems.

The question of conservation of hearing leads directly to that of compensation for losses acquired in industry. Politzer's statement that these cases cannot be judged from a medicolegal standpoint can scarcely be true today if, as is now believed by some, these acquired losses can be identified. Cases of this kind do appear before courts, and compensation boards are making awards for hearing losses. The amount of the award often appears to depend not on the amount of damage to hearing but on the relative technical skills of the legal representatives of the interested parties. A glance through the decisions from different states shows a lack of uniformity. Only a few states have adopted definite schedules. Insurance companies have worked out no general schedule of awards for acquired hearing defects comparable with that used for acquired visual defects. A committee of the Council on Physical Therapy of the American Medical Association is working on this problem at the present time. Fowler,¹³ a member of this committee, and Sabine,¹⁴ another member, have presented studies which

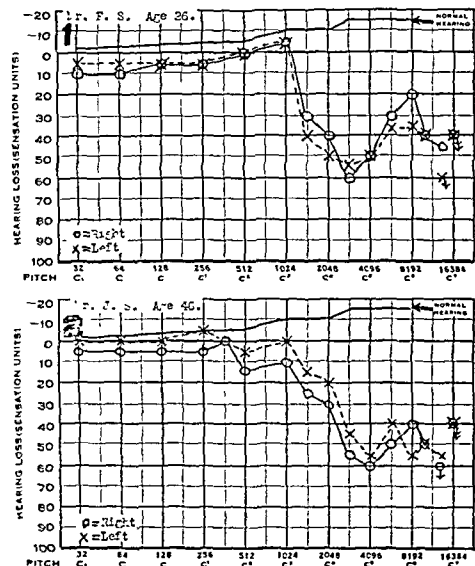


Fig. 10.—Audiograms of a farm tractor operator and a World War I whippet tank driver.

show that the problem is being considered in a practical as well as a scientific manner. In the near future a uniform scale based on these or other studies may possibly be universally adopted.

13. Fowler, E. P.: Tests for Hearing, chapter X, p. 420, of Nelson's *Loe-e Leaf Medicine of the Ear*, 1939.

14. Sabine, P. E.: *Tr. Am. Acad. Ophth. & Otol.* 1941, to be published.

12. Costen, J. B.: Personal communication to the author.

FAILURE OF AMINOACETIC ACID TO INCREASE THE WORK CAPACITY OF HUMAN SUBJECTS

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During the past decade aminoacetic acid has been used in the treatment of various myopathies and currently is the subject of debate relative to its value in the treatment of fatigue and in increasing endurance. Aminoacetic acid is also known as glycine and glycocholl. It is present in most of the common proteins, and by chemical analyses¹ one fourth of the protein, gelatin, has been shown to be aminoacetic acid.

From 1927 to 1929 Brand, Harris, Sandberg and Ringer² in their search for the precursor of creatine first gave aminoacetic acid to patients with progressive muscular dystrophy. Thomas, Milhorat and Techner³ in 1932 reported clinical improvement in certain patients with this disease after prolonged treatment with this amino acid. Brand and his co-workers⁴ in their original work, and later in 1933, and Boothby⁵ in 1934 failed to find such beneficial effect in patients with progressive muscular dystrophy when similarly treated. Boothby⁶ from 1932 to 1936 made an extensive study of myasthenia gravis and reported 50 per cent of his patients recovered sufficiently after treatment with aminoacetic acid to allow them to return to full or half time work. As a result of his observations, Boothby and other members of the Mayo Clinic⁷ considered the possibility of aminoacetic acid being of value in the treatment of simple fatigue. Wilder,⁸ in the ensuing discussion, warned that the sense of fatigue is more readily influ-

enced by suggestion than is any other malaise and, therefore, objective data and well controlled experiments were most important in a study on this subject. Subsequently he and his co-workers⁸ carried out a prolonged and controlled experiment and concluded that "the results of this experiment were not such as to encourage belief either that glycine appreciably affects the well-being of normal, healthy men or women of this age group, or significantly delays or mitigates the normal sense of fatigue."

There was little enthusiasm for the use of aminoacetic acid as a treatment for fatigue until 1939 when Ray, Johnson and Taylor⁹ reported significant increase in the work output in men, but not in women, following the ingestion of gelatin. In 1940 and 1941 Kaczmarek¹⁰ reported large increases in work output, especially in women, following the use of gelatin. In 1941 Chaikelis¹¹ stated that he had observed increases in strength following the use of aminoacetic acid.

In none of these favorable reports was there an adequate series of observations or controls.

Other students of the problem of fatigue have not found either gelatin or aminoacetic acid effective in reducing fatigue by increasing endurance. Dill and his co-workers¹² in an extensive study on students, using the grade walk, commonly known as the treadmill, as the method for measuring work output, found that gelatin did not produce considerable effects on the mechanical efficiency, the capacity for severe work of short duration, the limiting capacity for supplying oxygen to tissues or the level of lactic acid attained in maximal work. Likewise, Robinson and Harmon¹³ in similar studies on healthy male subjects found negative results following the administration of gelatin.

Hellebrandt, Rork and Brogdon¹⁴ studied the effect of gelatin on young women at the University of Wisconsin and arrived at the conclusion that gelatin has no effect on the capacity of women to perform maximal anaerobic work or any apparent effect on the rate of improvement due to training. These investigators compared the data of Ray and others with their own and suggested that the increase in work output attributed by Ray to gelatin may have been an effect of training.

Maison¹⁵ in a study on thoroughly trained and also untrained persons reported that neither gelatin nor aminoacetic acid increased the work ability of the extensor digitorum communis muscles working with or without blood supply.

Knowlton¹⁶ did not observe any difference in the performance of the isolated gastrocnemius muscle removed from rats fed gelatin and that from control rats not receiving gelatin.

From the Food and Drug Administration, Federal Security Agency, Washington, D. C.

This investigation was conducted by the Federal Food and Drug Administration at the District of Columbia Reformatory at Lorton, Va., through the courtesy of Robert E. Bondy, director of public welfare for the District of Columbia, Ray L. Huff, superintendent of penal institutions, and E. J. Welch, deputy superintendent of the District of Columbia Reformatory. Dr. Frank R. Kluge and other officials of the institution assisted the authors with the experiment.

1. Analyses by the Food and Drug Administration of six different makes of gelatin obtained from the open market revealed from 24.8 to 25.6 per cent of aminoacetic acid.

2. Brand, Erwin; Harris, M. M.; Sandberg, M., and Ringer, A. I.: Studies on the Origin of Creatine, *Am. J. Physiol.* **90**: 296-297 (Oct.) 1929.

3. Thomas, Karl; Milhorat, A. T., and Techner, Fritz: Untersuchungen über die Herkunft des Kreatins: Ein Beitrag zur Behandlung progressiver Muskelatrophien mit Glykokoll (Vorläufige Mitteilung), *Ztschr. f. physiol. Chem.* **205**: 93-98, 1932. Milhorat, A. T.: Ueber die Behandlung der progressiven Muskeldystrophie und ähnlicher Muskelkrankungen mit Glykokoll, *Deutsches Arch. f. klin. Med.* **174**: 487-517 (Jan. 12) 1933.

4. Harris, M. M., and Brand, Erwin: Metabolic and Therapeutic Studies in the Myopathies with Special Reference to Glycine Administration, *J. A. M. A.* **101**: 1047-1052 (Sept. 30) 1933. Brand, Harris, Sandberg and Ringer.

5. Boothby, W. M.: The Clinical Effect of Glycine in Progressive Muscular Dystrophy, in Simple Fatigability and on Normal Controls, *Proc. Staff Meet., Mayo Clin.* **9**: 600-603 (Oct. 3) 1934.

6. Boothby, W. M.: Myasthenia Gravis: Preliminary Report on the Effect of Treatment with Glycine, *Proc. Staff Meet., Mayo Clin.* **7**: 557-562 (Sept. 28) 1932. Boothby, W. M.; Adams, Mildred; Power, M. H.; Edgeworth, Harriet; Moersch, F. P.; Woltman, H. W., and Wilder, R. M.: Myasthenia Gravis: Second Report on the Effect of Treatment with Glycine, *ibid.* **7**: 737-756 (Dec. 28) 1932. Boothby, W. M.: Myasthenia Gravis: The Effect of Treatment with Glycine and Ephedrine: Third Report, *Arch. Int. Med.* **53**: 39-45 (Jan.) 1934. Myasthenia Gravis: Effect of Treatment with Glycine and Ephedrine: Fifth Report, *Proc. Staff Meet., Mayo Clin.* **9**: 593-597 (Oct. 3) 1934. Myasthenia Gravis: Sixth Report, *Ann. Int. Med.* **9**: 143-149 (Aug.) 1935. Myasthenia Gravis: Seventh Report, *Medical Papers Dedicated to Dr. Henry A. Christian, February 1936*, pp. 883-893. Myasthenia Gravis: Eighth Report, *Tr. A. M. Physicians* **51**: 188-198, 1936.

7. Wilder, R. M.: A Consideration of Muscular Pain and Fatigue with a Note on Glycine: General Discussion, *Proc. Staff Meet., Mayo Clin.* **9**: 606-608 (Oct. 3) 1934.

8. Wilder, R. M.: A letter to Dr. Harold Aaron, Consumer Union Reports, June 1939, p. 19.

9. Ray, G. B.; Johnson, J. R., and Taylor, M. M.: Effect of Gelatin on Muscular Fatigue, *Proc. Soc. Exper. Biol. & Med.* **40**: 157-161 (Feb.) 1939.

10. Kaczmarek, R. M.: Effect of Gelatin on the Work Output of Male and Girl Subjects, *Research Quarterly* **11**: 4-14 (June) 1940. Kaczmarek, R. M.: Effect of Gelatin and Sham Feeding on Work Output, Heart and Pulse Rates, *M. Rec.* **153**: 383-391 (June 4) 1941.

11. Chaikelis, A. S.: The Effect of Glycocholl (Glycine) Ingestion upon the Growth, Strength, and Creatinine-Creatine Excretion in Man, *Am. J. Physiol.* **122**: 578-587 (April) 1941.

12. Dill, D. B.; Knehr, C. A.; Robinson, S., and Neufeld, W.: Gelatin and Muscular Fatigue, personal communication to the authors.

13. Robinson, S., and Harmon, P. M.: The Effects of Training and of Gelatin upon Certain Factors Which Limit Muscular Work, *Am. J. Physiol.* **135**: 161-169 (May) 1941.

14. Hellebrandt, F. A.; Rork, Rozell, and Brogdon, Elizabeth: Effect of Gelatin on Power of Women to Perform Maximal Anaerobic Work, *Proc. Soc. Exper. Biol. & Med.* **43**: 629-634 (April) 1940.

15. Maison, G. L.: Failure of Gelatin or Aminoacetic Acid to Increase the Work Ability of Individual Normal Human Muscles, *J. A. M. A.* **115**: 1439-1441 (Oct. 26) 1940.

16. Knowlton, G. C.: Effect of Gelatin Feeding upon the Strength and Fatigability of Rats' Skeletal Muscle, *Am. J. Physiol.* **121**: 426-427 (Dec.) 1940.

Karpovich and Pestrecov¹⁷ in well controlled studies using different methods and types of subjects observed no effect on muscular performance from the feeding of gelatin over that found in controls receiving sham feedings of a nongelatin substitute.

PROCEDURE AND METHODS

The purpose of the investigation was to determine the effect of aminoacetic acid on the work capacity of human beings.¹⁸

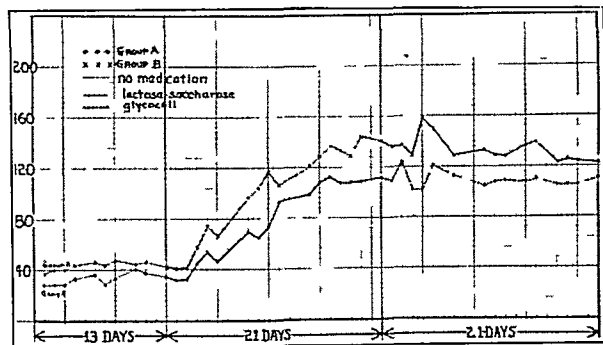


Chart 1—Study on work capacity of groups A and B The figures in the ordinate represent total kilowatt seconds

In order to eliminate as far as possible the subjective element, and at the same time to control the study as thoroughly as possible, the experiment was conducted in the following manner: Two sets of tablets similar in appearance, shape, form and taste were specially prepared for us by a pharmaceutical house. The investigators associated with the experiment knew only that one of these sets of tablets contained aminoacetic acid while the other set was a mixture of lactose and saccharose. The identity of the tablets was not revealed until the experiment had been completed, the final calculations made and conclusions drawn.

The voluntary subjects for the experiment were members of two football teams, all of whom, prior to the experiment, were given physical examinations and found to be physically fit to perform arduous exercise. It was explained that we were seeking to determine whether or not tablets containing gelatin were of value in preventing fatigue or increasing work capacity. They were led to believe that all the tablets contained gelatin. This was purposely done in order to determine what effect, if any, could be attributed to suggestion alone, under carefully controlled conditions. These men were familiar with advertisements in which claims had been made that gelatin was being used in the training of various prominent football teams and was of value in increasing endurance and relieving fatigue. Because of these claims, members of both football teams were enthusiastic about trying the experiment on themselves. A total of 36 men volunteered, and of these 33 completed the experiment. All the subjects were institutionalized, lived in dormitories, ate the same food, had the same recreational facilities and confinement and were subject to the same hours of sleep and work.

17. Karpovich, P. V., and Pestrecov, K. Effect of Gelatin upon Muscular Work in Man, *Am J Physiol* 134: 300-309 (Sept.) 1941.

18. The Food and Drug Administration during the past year has brought action against both gelatin and aminoacetic acid preparations the labeling of which made claims for their value in relieving fatigue and increasing endurance on the charges that these claims were false and misleading in the following notices of judgment under the Federal Food, Drug, and Cosmetic Act: Misbranding of Myasthene Tablets, number 100, Misbranding of Myasthene Tablets, to be published, Misbranding of Knox Gelatine, to be published.

The instrument used to measure the work output was a bicycle ergometer.¹⁹ This bicycle ergometer was reconstructed so that the work output was generated into electrical energy, and from the ampere and voltmeter readings the watt output per second was calculated. The mechanical efficiency of the machine was not determined. The rate of work output was maintained at approximately 144 watts per second, a rate which on this machine as a whole could not usually be maintained by a subject at the peak of performance longer than two or three minutes, although there were exceptional men who maintained this rate for five minutes. The exact watt output per second for each individual and the length of time he was able to maintain this rate of work was recorded for each subject daily with the exception of Sundays, holidays and other rare occasions.

Following a thirteen day training period, during which the subjects rode the bicycle without medication, data were recorded on the work capacity of each subject. On the basis of these observations the representatives of the Blue Football Team, who were of the Caucasian race, were divided into groups A and B, and those of the Brown Football Team, who were of the Negro race, into groups C and D. The men were distributed so that subjects with different capacities for work were present in all groups.

At the completion of the experiment the distribution of the 33 members completing the experiment was as follows:

- Group A, 6 members of the Blue Football Team.
- Group B, 8 members of the Blue Football Team.
- Group C, 9 members of the Brown Football Team.
- Group D, 10 members of the Brown Football Team.

Immediately following the preliminary study or training period groups A and C were given tablets identified as number 158 containing no aminoacetic acid and groups B and D, tablets identified as number 365 containing 7½ grains (0.5 Gm.) each of aminoacetic acid. The tablets²⁰ were given at a dosage of three tablets four times a day, with the exception of Sundays and holidays, on which days three tablets three times a day

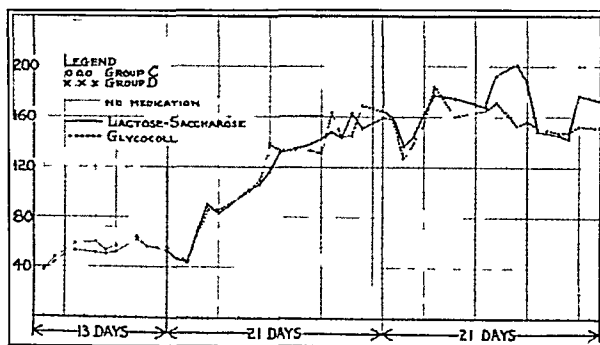


Chart 2—Study on work capacity of groups C and D The figures in the ordinate represent total kilowatt seconds

were given. The subjects therefore received, depending on the identity of the tablets, which was not known to the experimenters or the subjects, either a dose of

19. The bicycle ergometer originally used by Atwater and Benedict was remodeled and employed in this experiment. Atwater, W. O., and Benedict, F. G. Experiments on the Metabolism of Matter and Energy in the Human Body, U. S. Department of Agriculture, Office of Experiment Stations, bulletin 69, 1899. Experiments on the Metabolism and Energy in the Human Body, U. S. Department of Agriculture, Office of Experiment Stations, bulletin 109, 1902.

20. For investigating claims of certain manufacturers, a commercial aminoacetic acid preparation purchased on the open market was used according to directions on the labeling.

approximately 6 Gm. of aminoacetic acid daily except Sundays and holidays, when the amount ingested was approximately 4.5 Gm., or the control equivalent in lactose-saccharose.

After three weeks the tablets were reversed, so that groups A and C, who originally received the placebo, now received tablets of aminoacetic acid, while groups B and D, who had received the medication, now were given the placebo. There was no lapse in the experiment at the time of change of tablets and the subjects were not informed that there was any such change. The study was controlled as completely as possible with groups A and B serving as controls for each other with both sets of tablets, and groups C and D likewise being controlled. The individual subjects were in addition cross controlled, since they received both aminoacetic acid and lactose-saccharose tablets.

RESULTS OF THE EXPERIMENT

The results of the experiment are revealed in charts 1 and 2. A plateau was developed in the daily work output during the first thirteen days when no medication was given. During the next twenty-one days lactose-saccharose tablets were given to groups A and C and aminoacetic acid tablets to groups B and D. During the last twenty-one days these tablets were reversed.

A rapid and progressive increase in work output was observed for all groups during the period of study, regardless of the medication given, which is revealed in charts 1 and 2. The peaks of work output came for group A at the twenty-third day of medication at 208 per cent increase over the maximum attained during the training period, group B reached a 235 per cent increase on the twenty-fifth day of medication, group C attained 198 per cent increase by the twenty-sixth day while group D had an increase of 213 per cent on the thirty-fourth day of medication.

From charts 1 and 2 we find a strong similarity between the curves of all groups. In fact, the difference is less between curves of two groups receiving different medications, such as A compared with B, and C compared with D, than it is between the curves of groups A and C, and B and D, who received the same treatment but were of different races. There is no significant difference in the work output of the groups receiving aminoacetic acid and the control groups receiving lactose-saccharose. Recognizing the fact that lactose and saccharose do not have a specific effect on increasing work capacity, we find that aminoacetic acid does not have any effect on the work capacity of male subjects nor does it influence the rate of training which follows the daily riding of the bicycle ergometer over prolonged periods of time.

COMMENT

This study illustrates the necessity for adequate controls for an investigation of this type. Without controls, erroneous conclusions would have been drawn from the results we obtained during the first twenty-one day period for both aminoacetic acid and lactose-saccharose. It is interesting to note that the work capacity of all subjects invariably increased when they received tablets with the suggestion that they would counteract fatigue. Twenty-four subjects reported a subjective feeling of benefit with both the aminoacetic and the lactose-saccharose tablets, 4 reported no subjective benefit from either aminoacetic acid or lactose-saccharose, 2 reported subjective improvement only from the lactose-saccharose tablets and 3 reported improvement with aminoacetic acid. The members of groups C and D, of the Negro

race, were especially receptive to suggestion and felt that the tablets, regardless of whether they contained sugar or aminoacetic acid, were helping them, while members of groups A and B, who were Caucasian, were more dubious of their value.

In considering the claims which have been made for aminoacetic acid and gelatin, it should be pointed out that the food of the ordinary diet more than amply supplies the requirements of the body for these substances. Aminoacetic acid is not an essential substance for growth and nutrition. This has been proved by Rose²¹ in his nutrition experiments on animals in which this amino acid was found entirely dispensable. Quick²² has demonstrated that aminoacetic acid can be readily synthesized in the body by man at a rate of 13 to 17 Gm. daily, which far exceeds the ordinary requirements. Schoenheimer and his co-workers²³ by feeding amino acids containing the labeled nitrogen isotope N^{15} found that it was liberated from its original amino acid by the body and resynthesized into other amino acids and nitrogenous substances. Thus all ingested proteins, regardless of whether or not they contain aminoacetic acid, can be used by the body to synthesize aminoacetic acid in abundance.

The milk diet of the newborn and the casein diet used in the feeding of laboratory animals are both notably capable of maintaining growth, nutrition and health. Both diets are low in aminoacetic acid content and are indicative of the unessential characteristics of aminoacetic acid and gelatin.

Ray⁹ suggested that his observations of increased work output may be due to the creatinogenic effect of aminoacetic acid. Beard and Pizzolato²⁴ reported that the injection of various amino acids into rats resulted in an increase in the muscle creatine. These results have not been confirmed by other investigators,²⁵ and Bloch and Schoenheimer²⁶ in recalculating the data of Beard and Pizzolato found that on the basis of their observations most of their compounds would have had to yield more than 100 per cent of their nitrogen in order to form the increased amount of muscle creatine claimed. It is generally accepted²⁷ that the creatine content of muscle for a specie of animal is remarkably constant regardless of the food ingested.

Bloch and Schoenheimer²⁶ have now definitely established that aminoacetic acid, methionine and arginine together enter into the formation of creatine. These investigators²⁸ have further demonstrated that in the rat, an animal which has a protein metabolism remarkably similar to that of man, creatine is synthesized daily in amounts corresponding to about 2 per cent of the total creatine of animal tissues, and this is about the

21. Rose, W. C.: Nutritive Significance of the Amino Acids, *Physiol. Rev.* **18**: 109-136 (Jan.) 1938.

22. Quick, A. J.: The Conjugation of Benzoic Acid in Man, *J. Biol. Chem.* **92**: 65-85 (June) 1931.

23. Schoenheimer, Rudolf; Ratner, S., and Rittenberg, D.: Process of Continuous Deamination and Reamination of Amino Acids in Proteins of Normal Animals, *Science* **89**: 272-273 (March 24) 1939. Weissman, N., and Schoenheimer, Rudolf: Relative Stability of Lysine in Rats Studied with Deuterium and Heavy Nitrogen, *J. Biol. Chem.* **140**: 779-795 (Sept.) 1941. Schoenheimer, Rudolf: Studies in Protein d Formation Studied with Aid of Nitrogen (Jan.) 1939.

24. Beard, H. H., and Pizzolato, P.: *J. Biochem.* **28**: 421-443 (Nov.) 1938.

25. Fisher, R. B., and Wilhemi, A. E.: Observations on Relation of Urea and Glycine to Creatine Synthesis, *J. Biol. Chem.* **132**: 135-146 (Jan.) 1940.

26. Bloch, Konrad, and Schoenheimer, Rudolf: The Biological Precursors of Creatine, *J. Biol. Chem.* **138**: 167-194 (March) 1941.

27. Rose, W. C.: The Metabolism of Creatine and Creatinine, *Annual Review of Biochemistry* **4**: 258, 1935; personal communication to the authors.

28. Bloch, Konrad; Schoenheimer, Rudolf, and Rittenberg, D.: Rate of Formation and Disappearance of Body Creatine in Normal Animals, *J. Biol. Chem.* **138**: 155-166 (March) 1941.

same quantity as is daily excreted as creatinine. Since gelatin is an incomplete protein²⁹ and contains little if any methionine or other sulfur bearing amino acids, it cannot in itself lead to the formation of creatine.

In the currently recognized theories of muscular contraction, the hypothesis that phosphocreatine furnishes chemical energy for muscular contraction has been abandoned. Sacks³⁰ has shown that vigorous muscular contraction can take place even when the phosphocreatine content of the muscle is extremely low. Furthermore when phosphocreatine is broken down to its component parts, phosphoric acid and creatine, it is readily resynthesized to phosphocreatine and is not destroyed.

It is evident from recent studies in nutrition that the proteins of the ordinary diet provide a more economical, palatable and satisfactory supply of protein and amino acids than can be obtained by the special use of the incomplete protein gelatin or its unessential principle constituent aminoacetic acid. The metabolism of amino acids is illustrated in chart 3.

FOOD

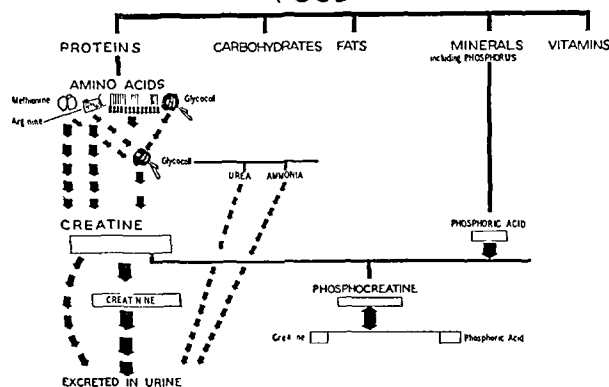


Chart 3—Diagram of the metabolism of amino acids

SUMMARY AND CONCLUSIONS

1 Thirty-three male subjects of both the white and the Negro race were given aminoacetic acid in daily amounts of from 4.5 to 6 Gm., under rigidly controlled conditions, over a period of three weeks. There was no effect on the work capacity of these subjects when compared with controls receiving lactose-saccharose under identical conditions or with cross control of the same subjects when receiving lactose-saccharose in the same manner.

2 A review of recent studies in protein metabolism reveals that the claims made for the especial value of aminoacetic acid or gelatin in the treatment of fatigue or increasing endurance are unfounded on theoretical grounds and that the protein of the ordinary diet is fully capable of supplying the aminoacetic acid requirements of man. It is also pointed out that the incomplete protein gelatin is deficient in methionine, one of the amino acids necessary for the synthesis of creatine.

3 It is evident from these experiments that a study of the effects of a drug on fatigue must be meticulously controlled; the drug under study should be administered alternately with a placebo identical in physical characteristics and the identity of each should be unknown to the subjects as well as to the investigators.

RECENT TRENDS IN PHYSICAL EXAMINATION UNDER CIVIL SERVICE

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With reference to the number of employees on the roll, and the number of occupations represented, the federal government is the nation's leading employer. The number of different kinds of positions is in the thousands, and, as to duties, they range from sedentary work such as that of a typist, in which it is possible to set a physical standard so liberal that many handicapped persons can be admitted to the competition, to positions of immigration patrol inspector or of policeman, in which the duties demand as nearly perfect a physical specimen as it is possible to secure, young, robust and able to endure hardship and prolonged exertion.

The Civil Service Act when passed in 1883 covered only 13,780 positions. These were practically all of the clerical or office types of employment. At that time there were no general laws providing for compensation for persons injured as a result of employment, the only relief possible in such cases being through an act of Congress, a procedure often unsuccessful and, when successful, a process sometimes involving years and attorney fees. General laws did not come until 1916.

There was in 1883 no provision for the retirement on annuity of aged or infirm employees; the choice between retaining them while able to perform only partial or no service or removing them without means to live on being determined by the social conscience of the head of the bureau or the department.

For these reasons, ability to perform duty and the danger to fellow workers from communicable disease were the only questions to be considered and little systematic consideration was given these, the Civil Service Commission having a very small force on its payroll, about fifteen in all, and being overloaded with other duties.

For one organization, however, the Railway Mail Service, beginning with its classification in 1889, because of the severe and exacting character of the work required and the great strain on the physical constitution and powers of endurance, a physical examination was required as a condition precedent to appointment.

In 1896 an order of President Cleveland brought in, among other positions, a number of mechanics and handicraftsmen, raising the total of classified positions to 87,044. In connection with these trades positions, physical qualifications were introduced as a notable element of the examination. The medical certificate was sometimes executed by a federal doctor but usually by the applicant's own physician. In 1903 Congress appropriated for the first full-time doctor on the commission's rolls—a doctor who had been employed in industrial medicine by the Roebbling plant in New Jersey. A large proportion of his time was employed in rating the written examination papers of applicants for physicians, dentists, veterinarians, nurses and other medical and related fields. Attention was given, however, to the types of physical ability desirable for trades positions.

²⁹ Schmidt, C. I. A. The Chemistry of the Amino Acids and Proteins, Springfield, Ill., Charles C. Thomas, 1938, p. 217.

³⁰ Sacks, J. Changing Concepts of the Chemistry of Muscular Chemistry, personal communication to the authors.

In 1916 a general employees' compensation law was passed and the Employees' Compensation Commission created. It had hardly begun to function before the World War with its demand for man power in navy yards, arsenals and other branches of the government service resulted in little attention being paid to the physical qualifications of persons who had the necessary skill to perform duty in the emergency. The number of positions in the competitive classified service in the year prior to the war was 297,000; this total jumped to over 642,000 in the year 1918. It must be remembered that turnover was heavy and that this number represents only the employees under the competitive system administered by the Civil Service Commission, the total number of federal employees being much larger. As a result of the necessary employment of persons who were below a desirable physical standard of health the World War was followed by a great number of claims under the Employees' Compensation Act.

In 1920, acts for the retirement on annuity of civilian employees were passed, covering both retirement for age and retirement for disability before the normal age limit is reached.

The great bulk of claims for disability for injury due to employment naturally centered in the navy yards and the arsenals, the federal manufacturing establishments. As a result the War and the Navy departments in 1921 established the requirement that all persons entering the employment of the navy yards and the arsenals would be given an examination by a member of the Army or the Navy Medical Corps to determine their physical condition and fitness for duty.

This procedure was extended by the Civil Service Commission in 1923, under an order of the President of the United States, to all competitive positions; that is, a physical examination by a federal medical officer was made a part of the appointment routine for each competitive position. The order of the President provided the necessary authority for the commission to call on federal medical personnel to make the examinations. On June 30, 1941 the total number of competitive classified positions was 1,358,150.

PHYSICAL FITNESS

The preceding remarks give a background for the reasons for the present elements considered in passing on the physical fitness of an applicant for employment in the classified civil service. These are:

1. Is the applicant physically capable, on the entrance date, of performing the duties of the position?
2. Is the physical stamina of the applicant such that he will not be a compensation hazard, and is it such that he will not constitute an accident risk to himself or to his fellow workers or others?
3. Is the health of the applicant at the present time such that he will not constitute a retirement hazard?

Each of these elements requires a careful job analysis of the duties of each of the thousands of different employments, both as to the effect of physical defects on the ability to perform efficient duty until the normal retirement age is reached and as to the relation of such defects to employment hazards to the worker or others. The results of studies of the statistics of employees' compensation claims, and of the causes of premature retirements for disability, must be combined with job analysis studies to arrive at a decision which will be of value in drafting physical requirements. The actual

analysis of the job must be thorough and should be made on the job, especially for trades positions.

Within the past year the commission has established a medical division, headed by a medical director, to deal with matters which involve medical science in the field of civil service employment. The duties of the position of head of the division are, in part:

To be responsible for all steps taken by the commission to control physical standards and regulations for federal government employees and candidates for such employment, including reviewing, revising and establishing medical procedures, regulations and rules governing standards of physical fitness to be set and enforced in recruiting for government employment; also the directing of the planning and conduct of examinations for positions in the government service in medical and related fields.

The incumbent acts as medical adviser to the commission, interpreting the medical problems in programs concerning recruiting, employment or retirement. He also cooperates with officials of other government agencies, particularly the United States Public Health Service, the Veterans' Administration, the War and Navy departments and other agencies employing medical staffs, in developing employment programs and policies. The incumbent also keeps in close touch with medical schools and hospitals and with professional medical and other organizations in order to maintain the best recruiting standards and also to develop types of training calculated to serve better the needs of the government.

This division has been organized and, in addition to the director, includes a force of physicians at Washington, D. C., and the necessary supporting personnel. Under his direction there is also a medical officer in the headquarters office of each of the thirteen civil service districts.

The program for establishing standards of physical fitness includes a study of the duties of each type of position, not only those in federal employment but also in large private industrial organizations. These studies are made either from the central office at Washington or by the associate medical officer at the district headquarters. This has been done so far by the central office for over five hundred different positions. Once the duties of a job are broken down into the actual processes involved, the applying of the appropriate physical requirements to insure efficient physical ability to produce while avoiding undue employment and retirement hazard is much simplified. The five hundred different employments cover many thousands of different employees and have been classified under fifteen different standard formulas ranging from the liberal standard possible for desk duty where the physical labor involved is light to the most exacting with respect to physical and nervous strain.

APPLICATION OF STANDARDS

It may here be desirable to mention briefly the mechanics of applying these standards. The employing officer calls on the commission for the names of persons qualified to perform certain duties. An announcement for a competitive examination is prepared and this includes a "physical ability" requirement. The medical division consults with the person or persons in the department on the duties to be performed. If these clearly fall under one of the standard formulas, the appropriate formula is included in the announcement. If not, a special formula is devised. Thus the public

is informed of the degree of physical fitness demanded for appointment. Persons with remediable diseases or defects may make application and have the defect corrected while the examination process is progressing, and, therefore, if they pass the other elements of the examination they may be acceptable for appointment by the time the papers are rated. If the correction cannot be made by that time, correction at any time during the life of the eligible register will entitle the applicant to full eligibility.

At the time of appointment a medical certificate is required to supply a record of the appointee's physical status when the government assumes responsibility under employees' compensation and disability retirement statutes.

In normal times this certificate must be executed by a doctor of medicine employed by the federal government. During the present war emergency, because of the unusual amount of work imposed on these government officers, the certificate of any duly licensed doctor of medicine is being accepted.

In cases known as noncompetitive, for example, in which a person who has had previous service and has been separated from a department is nominated for reinstatement, a more liberal standard than the competitive one is adopted. The previously acquired training or experience being taken into consideration, in view of the greater value to the service of the former employee as compared with a new one, the inquiry is usually confined to ability to perform duties satisfactorily without danger to the person himself or to others.

An important phase of the work of the medical division is the study of the extent to which persons with physical handicaps may be given employment. Study is required to determine the degree of defective physical condition which will meet the employment elements aforementioned for any given duties and the extent to which it is possible to employ persons handicapped by (to name a few of the more common conditions encountered) defective vision, defective hearing, deafmutism or orthopedic defects such as amputations or congenital absence of limbs or parts of limbs, or the ankyloses, loss of muscular power or atrophies resulting from disease or injury. Tuberculosis, heart disease, syphilis and hernia are also found in applicants for the government service. The present trend in setting physical standards is to give the handicapped persons every possible opportunity to compete for employment. However, the commission cannot appoint (to other organizations than its own) nor can it extend a preference to civilian applicants who suffer from a handicap as compared to the nonhandicapped citizen. It can admit to an examination, but the individual must pass the mental and other portions of the test with a sufficiently high rating as compared with other competitors to entitle him to have his name presented to an appointing officer. Under the civil service rules a sufficient number of names are presented to the appointing officer to enable him to consider three names in connection with each vacancy to be filled, and the appointing officer has the right to choose any one of the three. Many persons with handicaps enter the competitive examinations and receive appointment.

Honorably discharged soldiers, sailors and marines, however, are an exception, they being given special consideration under law when suffering from service connected disability, and their widows and wives (under certain conditions) are also entitled to this special consideration.

A study has been made whereby persons with a high degree of refractive visual error may, on furnishing evidence on special examination by a recognized ophthalmologist that the defect is due to refractive error alone and not to progressive disease of the eye, are admitted to examinations for positions in which acute vision without glasses is not required provided the vision is corrected by glasses. This does not apply to such positions as policeman, in which the possession of acute vision without glasses is necessary.

Examinations covering many thousand positions are opened to deaf-mutes and the hard of hearing and to persons suffering from orthopedic defects.

The question of applicants who have a history of syphilis has been given much consideration within the past two years. In cooperation with the U. S. Public Health Service, the following procedure has been adopted:

Those persons who have had inadequate treatment, but who are not a hazard to themselves or fellow workers, are accepted for temporary appointment, pending further treatment and medical observation, and this last provision affords them an opportunity for employment while they are still under medical care. Further treatment and medical observation in the case of persons who have had inadequate treatment is the responsibility of the private physician. If, as the result of further treatment and observation, the temporary employee is found to meet the full physical requirements for probational appointment, his temporary appointment is converted to a probational one, effective as of the date that he entered on the temporary appointment.

With respect to persons who have a history of tuberculosis, they are admitted to examinations when the duties are not too arduous, but they cannot be certified as fitted for employment until the condition has been arrested for at least one year and the general health is good.

In dealing with the problem of the handicapped, the commission cooperates with the federal and state bureaus of rehabilitation and with private organizations seeking placement for such individuals.

In government employments, the salaries and hours of labor being fixed by law, it is not possible to have the same flexibility as in private employment. The private employer is not required by law to appoint through competition among all citizens and can therefore permit sympathy to govern his action and can modify the compensation paid to agree with the ability of the individual, by part time or piecework employment or by reduction of wages paid.

During the present emergency a shortage of man power has developed in many employments, and the most important function of the commission at this time is to recruit through publicity of every kind, by radio, through the press or by direct contact, persons who have the special skills or knowledge required to carry out the war program. The shortage in doctors is acute, as also in the supporting occupations of nurse, medical technician and hospital attendant.

The massive increase in current work caused by the emergency has required the postponement of any projects for research or study which will interfere with the immediate objective of providing man power for the war work.

The commission is a service agency, and some idea may be formed of the burden imposed on it when it is noted that, in the twelve months ended last June,

close to ten million pieces of correspondence were received. From June 1, 1940 to Dec. 27, 1941 898,997 placements were made in the War and Navy departments alone—note the alone. This does not mean that the commission has been called on to fill this many new positions. It means that in order to fill vacancies in existing positions, as well as to fill new positions, it has been necessary for us to place this many persons in the federal service.

JUVENILE HYPERTENSION ASSOCIATED WITH UNILATERAL LESIONS OF THE UPPER URINARY TRACT

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AND

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Hypertension in childhood is frequently associated with abnormalities of the upper urinary tract. Lesions may be unilateral or bilateral, congenital or acquired, inflammatory, neoplastic or obstructive. If bilateral the renal disease often advances rapidly to terminate in hypertensive crises and death from apoplexy or from renal or cardiac failure. If the disease is unilateral removal of the involved kidney or correction of the obstruction may effect a decline in blood pressure to lower or normal levels and remission of the hypertensive symptoms.

The purpose of this paper is threefold: (1) to present in detail 1 case of juvenile hypertension associated with pyelonephritis and aplasia of one kidney, relieved by nephrectomy, (2) to review the few reported cases in which surgical treatment has been employed for unilateral renal disease with hypertension in childhood and (3) to discuss certain deductions pertinent to the earlier recognition and diagnosis of this syndrome.

REPORT OF CASE

J. V., a white boy 6 years of age, was referred by Dr. W. M. Thomson, of Delhi, N. Y., on June 11, 1940 because of abdominal pain, anorexia, high blood pressure and convulsions.

Family History.—No history of familial hypertension, cardiac disease or nephritis was elicited.

Past History.—The patient was born at full term by normal, spontaneous delivery. His infancy and early childhood were apparently uneventful. At the age of 5 years he had a rash for two days without subsequent desquamation; at the same time his brother was ill with scarlet fever.

Present Illness.—The present illness began in May 1939, thirteen months prior to admission, with paraumbilical pain which was ascribed by his local physician to infection of the bladder and which persisted intermittently for three months. The child was then asymptomatic until the middle of January 1940, when he had a sudden recurrence of pain around the umbilicus while at breakfast. The pain continued spasmodically during the next six weeks, was frequently precipitated by eating and was accompanied by anorexia and constipation. In April he was sent home from school with an unusually severe attack of the same type of paraumbilical pain. Blood and mucus were obtained by enema. The rectal temperature was 104.6 F. The blood pressure was first recorded at that time; the systolic level was 156 mm. of mercury and the diastolic 114. The boy improved subjectively with conservative therapy, although some elevation in temperature persisted for several weeks. Late in May the systolic pressure was 190. Early in June the abdomi-

nal pain recurred. The following day the child was dull and stuporous, vomited several times and frequently expressed a desire to void but was unable to do so. The next morning he had a generalized convulsion which lasted three and one-half hours. During the subsequent three days he was irrational. The systolic blood pressure, recorded by his local physician, was 230.

Physical Examination.—When admitted to the Mary Imogene Bassett Hospital the boy was frail, emaciated and dehydrated; he weighed 36¾ pounds (16.6 Kg.). The rectal temperature was 98.4 F.; the pulse rate was 86 per minute and the respiratory rate 20. The systolic blood pressure was 230; the diastolic, 180. The tonsils were deeply embedded and cryptic; the pharynx, granular. There was slight dulness, with some limitation of respiratory excursion at the pulmonary bases. The heart was enlarged to the left; the cardiac sounds were exaggerated, particularly over the aortic area; no murmurs were audible. The radial arteries were distinctly thickened and difficult to compress. The abdomen was moderately distended and "doughy" in consistency throughout, particularly in the right hypochondrium; there was some tenderness just above the umbilicus; no masses were palpable; neither kidney could be felt. The deep reflexes were normal.

Ophthalmic Examination.—Both pupils were partially dilated and reacted only slightly to light. The cornea and iris of each eye were normal; the tension was normal to palpation. Both disks were choked, the right more so than the left. Large "cotton wool" areas of exudate were seen on the temporal side of both disks; there were also two small areas nasal to the left disk. There was edema of both macular regions and an old healed lesion in the right. Dr. James I. Farrell, who made the examination, expressed the belief that these changes were "without any doubt due to hypertension."

Laboratory Data.—Urine: The maximal specific gravity of the urine was 1.010; the reaction, alkaline. A slight trace of albumin was present. The sediment contained a few clumped and single leukocytes and an occasional hyaline cast.

Blood: The hemoglobin content was 12.9 Gm. per hundred cubic centimeters. The erythrocyte count was 4,450,000 per cubic millimeter and the leukocyte count was 32,500 per cubic millimeter with 95 per cent polymorphonuclear neutrophils; the hematocrit reading was 34.9 per cent cells; the sedimentation rate was 26 mm. in one hour corrected.

Blood Chemistry: The concentration of blood sugar was 93 mg. per hundred cubic centimeters; of non-protein nitrogen, 29 mg.; of total serum protein, 5.82 Gm.; of albumin, 2.97 Gm.; of globulin, 2.85 Gm.; of calcium, 9.3 Gm.; of chloride, 88.7 milliequivalents.

Stool: The guaiac test for occult blood gave a 4 plus reaction; no ova or parasites were found.

Renal Function: The excretion of phenolsulfonphthalein was 50 per cent in the first hour and 10 per cent during the second hour.

Röntgenologic Studies.—A roentgenogram of the chest showed nothing of note in the pulmonary fields. Employment of a barium sulfate enema revealed no abnormality of the colon. Intravenous pyelograms disclosed no opaque medium in the calices or pelvis of the right kidney; the calices, pelvis

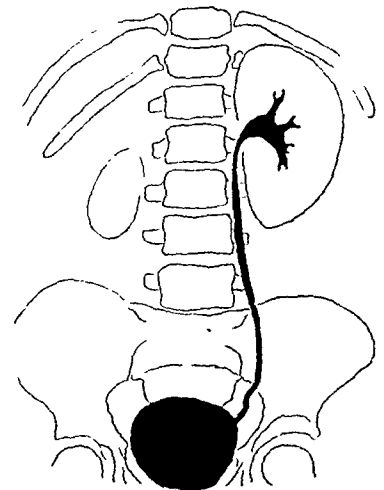


Fig. 1.—Tracing of the intravenous pyelogram. The right renal shadow was small and indistinct; no dye was apparent on this side. The left renal shadow was large; the calices, pelvis and ureter were normal.

and ureter on the left side were well visualized and seemed normal; the right renal shadow was small and indistinct; the left was large, smooth in outline and normal in contour (fig. 1).

Course.—During the first eight days in the hospital the boy was drowsy and fretful and continued to have anorexia and intermittent attacks of abdominal pain. The systolic blood pressure varied from 200 to 244; the diastolic, 150 to 208

(fig. 2). The hemoglobin content dropped to 10.6 Gm.; the erythrocyte count, to 2,980,000 per cubic millimeter, and the leukocyte count, to 20,900, with 82 per cent polymorphonuclear neutrophils. Cystoscopy, ureteral catheterization and retrograde pyelography were planned, but the boy was so apprehensive that the examination could not be conducted without subjecting him to anesthesia, which seemed at the time an unnecessary hazard. The data at hand appeared adequate to warrant exploration of the right kidney without further investigation.

Operation.—Nephrectomy and subtotal adrenalectomy on the right side were performed, with general drop ether anesthesia.

The renal fossa was exposed by a transverse incision from the costolumbar angle forward to the linea semilunaris. By retroperitoneal dissection a tiny structure resembling a ureter was identified and followed upward to the point at which it terminated in a miniature thin-walled pelvis, surrounding which was a small aplastic kidney about twice the size of a lima bean (fig. 3). The kidney and the upper portion of the ureter were removed.

The appearance of the right adrenal gland was normal. The lower half was excised and the wound closed in layers.

Surgical Specimen.—Macroscopic Description: The kidney weighed 4 Gm. and measured 4 cm. in length by 2 cm. in greatest width; it was flattened from side to side and measured only 6 mm. in thickness. The capsule was about 1 mm. thick and firmly adherent to the kidney and ureter. The exposed surface was pale pinkish yellow; no scars were apparent. Anterior to the pelvis, at the margin of the renal parenchyma, were three small vessels with diameters much less than 1 mm.; posterior to the pelvis were two vessels, each about 1 mm. in diameter. None of these showed any gross thickening or thrombosis. On section, the pelvis and calices were relatively enlarged with respect to the renal parenchyma. Over the calices the parenchyma was only 5 mm. wide; there was no color or marking to suggest normal renal structure. The attached ureter was 5.5 cm. long; the lumen was patent.

The adrenal tissue was grossly normal and measured 1.3 by 1.2 by 0.5 cm.

Microscopic Description: The small size of this kidney was the result of aplasia with superimposed chronic pyelonephritis. Certain areas were devoid of glomeruli or their scars and were characterized by the predominance of wavy collagen fibers supporting scattered collecting tubules and tubules lined with pelvic epithelium (fig. 4). Such areas were indicative of faulty renal development. Other sections showed periglomerular fibrosis, interstitial lymphocytic infiltration and dilatation of tubules

with colloid casts that were considered typical of chronic pyelonephritis (fig. 5). The arteries and arterioles revealed the changes characteristic of hypertension. The arterioles showed hyperplastic arteriosclerosis (fig. 6); the medium-sized arteries showed severe productive endarteritis and the larger ones moderate endarteritis (fig. 7).

The sections of adrenal tissue were normal.

Diagnoses.—The diagnoses were chronic pyelonephritis, aplasia and arteriosclerosis of the kidney.

Postoperative Convalescence.—The systolic blood pressure fell steadily to 130 and the diastolic to 94 on the second postoperative day (fig. 2), at which levels, with a little diurnal variation, they remained during the subsequent convalescence. The wound healed by first intention. Reexamination of the fundi on the sixth day disclosed less dilatation of the pupils, less swelling and edema of the disks and maculas and no fresh hemorrhages; there was still a considerable number of "cotton wool" areas of exudate. One week later the appearance of both disks was much improved, with only slight residual blurring of the margins. No hemorrhages were seen, and the exudate was gradually disappearing. The visual fields and the vision of each eye were normal. Ten days after operation the hemoglobin content was 12.1 Gm.; the erythrocyte count, 4,020,000, and the leukocyte count, 9,000, with 62 per cent polymorphonuclear neutrophils. The stool contained no occult blood. The specific gravity of the urine varied from 1.009 to 1.013, and the culture was sterile. Clinical improvement was striking, and the patient was discharged on July 6. His weight was 41 pounds (18.6 Kg.).

Subsequent Observations.—On July 24 the boy looked remarkably well. The heart was not enlarged, and the sounds were normal. The systolic blood pressure was 140; the diastolic, 100. The fundi, the visual fields and the vision of each eye were normal.

In April 1941, ten months after operation, the patient was readmitted to the hospital for study. During the interim he had been going to school and leading a normal, active life. His appetite was good, his bowel movements regular without catharsis and his urination normal. He had had no headache and no abdominal pain. He had gained 12 pounds (5.4 Kg.). Except for some enlargement of the tonsils and injection of the pharynx, the results of complete physical examination were normal. There was no thickening of the radial arteries. Both pupils were round and reacted well to light and in accommodation. The tension of each eye was normal to palpation. The media were clear throughout. Both disks were normal in color, with sharp, clear margins and rather large, deep physiologic cups. The blood vessels appeared entirely normal, and no areas of exudate, hemorrhage or atrophy were seen in either fundus. The blood pressure was 130 systolic and 80 diastolic. Twenty-four consecutive hourly readings did not vary more than 5 mm. above

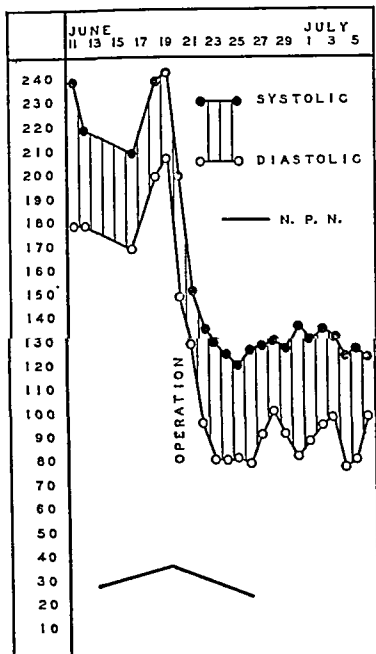


Fig. 2.—The blood pressure in millimeters of mercury and the nonprotein nitrogen level in milligrams per hundred cubic centimeters of blood during hospitalization.

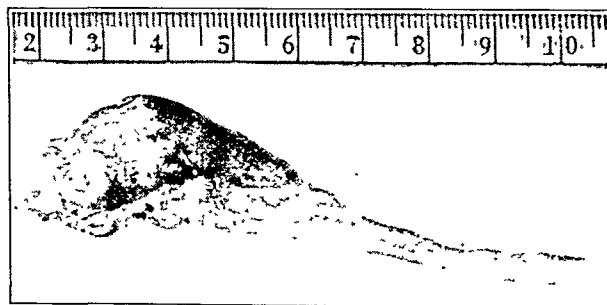


Fig. 3.—Posterior surface of the aplastic right kidney, pelvis and upper portion of the ureter.

or below these levels. During the cold pressor test the systolic pressure rose to 175 and the diastolic to 120; one minute later both had returned to their previous levels.

The hemoglobin content and the erythrocyte, leukocyte and differential counts were normal. The specific gravity of the urine was 1.025; there was no albumin, and the sediment was normal. The excretion of phenolsulfonphthalein was 60 per

nonprotein nitrogen content of the blood was 21 mg. per hundred cubic centimeters; the values for total protein, albumin, globulin, calcium and phosphorus in the serum were normal.

COMMENT

The blood pressure, ten months after nephrectomy, is not normal for a boy of his age. However, it has remained well below the preoperative levels and all symptoms of hypertension have disappeared.

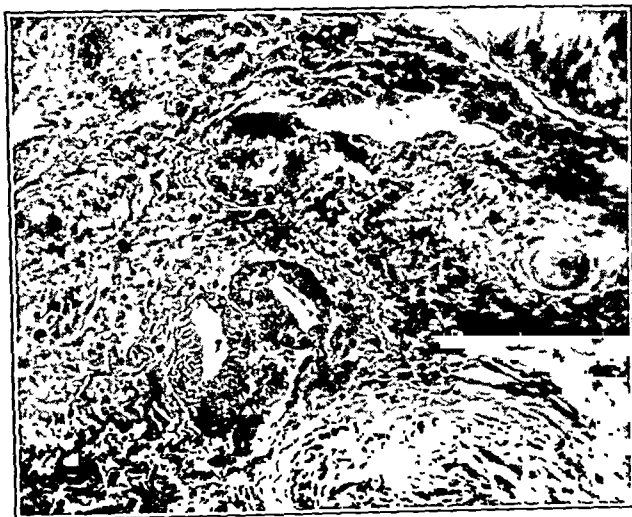


Fig. 4.—Section of an area of incomplete renal development. Several tubules lined with transitional epithelium are scattered through a region made up of collagen fibers and connective tissue.

The excessive response to the cold pressor test suggests that the child should now be included in the group termed by Hines¹ "hyperreactors," in which he has classified as "prehypertensive" those children who have excessively labile blood pressures.

The failure of this boy's pressure during rest and sleep to fall significantly below 130 systolic and 80 diastolic may be indicative of unsuspected pyelonephritis and arteriosclerosis of the remaining kidney. Nevertheless, as measured by the usual tests the function of this organ is normal and the child is apparently well. Whether he will remain well can be determined only by the lapse of time.

From the gross and microscopic examination of the surgical specimen, it seems probable that the hypertension was due to pyelonephritis superimposed on congenital hypoplasia of the kidney² which, in turn, was secondary to defective arteriogenesis.³

REVIEW OF REPORTED CASES

Survey of the literature discloses only a small group of patients under 14 in whom hypertension associated with unilateral renal disease was relieved, at least temporarily, by removal of the affected kidney. These cases represent the group with which this paper is concerned and in which thorough urologic investigation and well planned operative attack may effect a decline in blood pressure. The renal lesions in the 10 reported cases may be classified dominantly (1) neoplastic, (2) obstructive, (3) congenital or (4) inflammatory. The reported cases of each type of lesion are reviewed briefly herewith.

1. *Neoplastic Lesions.*—Pincoffs and Bradley⁴ first called attention to the association between neoplasm of the kidney and hypertension in children. In 1937 they published 4 cases of Wilms's tumor in infancy and early childhood; the tumor in each case was associated with hypertension. Two of the patients were operated on; nephrectomy was followed by a temporary drop in blood pressure; hypertension returned with recurrence of the tumor. The authors came to the conclusion that "the hypertension was in some way a consequence of the tumor growth," but they were unable to find any pressor substance in "extracts of the tumor or the inclusion within it of aberrant chromaffin tissue." Three years later Koons and Ruch⁵ reported relief of hypertension by nephrectomy for Wilms's tumor in a girl aged 7 years. They expressed the opinion that the preoperative elevation of the blood pressure was probably due to interference with renal circulation by pressure of the tumor invading the pedicle and the adjacent lymph nodes or by pressure of the neoplastic mass around the kidney, acting in the same manner as the cellophane envelope used experimentally by Page.⁶

2. *Obstructive Lesions.*—Bothe⁷ has published 2 cases of juvenile hypertension associated with hydronephrosis secondary to ureteral obstruction. The first was that of a girl with obstruction caused by an aberrant vessel at the ureteropelvic junction; the blood pressure four and one-half years after nephrectomy was normal. In the second case, that of a boy with constriction at the ureterovesical junction, the blood pressure declined after operative relief of the obstruction by incision and dilation of the ureteral orifice.

3. *Congenital Lesions.*—Leadbetter and Burkland⁸ have reported an extremely interesting case of hypertension of unilateral renal origin which may well be

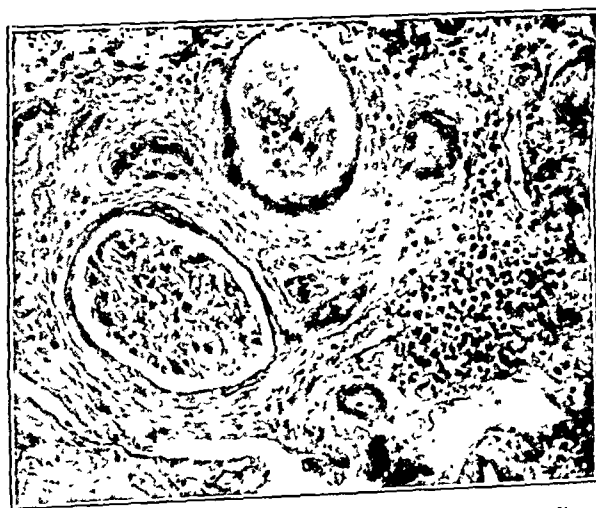


Fig. 5.—Section of an area of chronic pyelonephritis. The fibrous interstitial tissue is infiltrated with lymphocytes.

included in this category. The patient was a Negro boy aged 5½ years with an ectopic kidney the main artery of which was partially occluded by "an intra-arterial

1. Hines, E. A., Jr.: The Hereditary Factor in Essential Hypertension, *Ann Int. Med.* 11: 593-601 (Oct.) 1937.

2. Weiss, Soma, and Parker, Frederic, Jr.: Pyelonephritis: Its Relation to Vascular Lesions and to Arterial Hypertension, *Medicine* 18: 221-315 (Sept.) 1939.

3. Coplin, W. M. L.: Unilateral Renal Hypoplasia and Dysplasia Due to Defective Arteriogenesis: Relation to So-Called Hypogenetic Nephritis, *Am. J. M. Sc.* 153: 381-395, 1917.

4. Pincoffs, M. C., and Bradley, J. E.: The Association of Adenocarcinoma of the Kidney (Wilms' Tumor) with Arterial Hypertension, *Tr. A. Am. Physicians* 52: 320-325, 1937.

5. Koons, K. M., and Ruch, M. K.: Hypertension in a Seven Year Old Girl with Wilms' Tumor Relieved by Nephrectomy, *J. A. M. A.* 115: 1097-1098 (Sept. 28) 1940.

6. Page, I. H.: The Production of Persistent Arterial Hypertension by Cellophane Perinephritis, *J. A. M. A.* 113: 2046-2048 (Dec. 2) 1939.

7. Bothe, A. E.: Pyelonephritis in Children and Adults with Hypertension, *J. Urol.* 42: 969-981 (Dec.) 1939.

8. Leadbetter, W. F., and Burkland, C. E.: Hypertension in Unilateral Renal Disease, *J. Urol.* 39: 611-626 (May) 1938.

mass of smooth muscle, thought probably congenital" in origin. The elevation of blood pressure in this case presumably developed under conditions which simulated closely those produced experimentally in animals by unilateral application of the Goldblatt clamp.⁹ After nephrectomy the blood pressure fell promptly to normal.

4. *Inflammatory Lesions.*—Patients with lesions of this type included those on whom interest is chiefly

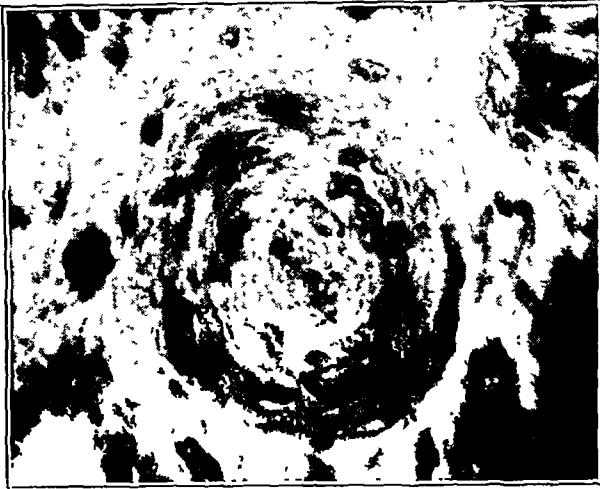


Fig. 6.—Section of an arteriole from an area of chronic pyelonephritis. Advanced hyperplastic arteriosclerosis is apparent.

focused at the present time, namely children and adults with hypertension secondary to chronic pyelonephritis. In the literature there are numerous cases proved by postmortem examination in which juvenile hypertension was associated with bilateral pyelonephritis. However, only 4 cases of patients under 14 years of age have been discovered in which the renal lesion was unilateral and in which nephrectomy was followed by a decline in blood pressure to normal or essentially normal levels. These cases were published by Butler,¹⁰ Barney and Suby,¹¹ Patch, Rhea and Codnere¹² and Kennedy, Barker and Walters.¹³ The immediate operative results have been excellent, but, as is true of the case reported in detail earlier in this presentation, the children have not yet been observed over a sufficient period of time for one to state with assurance that the hypertension has been permanently relieved by nephrectomy.

The renal lesions which may be responsible for hypertension in childhood are many and varied; only a few are amenable to operative treatment. Obviously, the first criterion for successful operation is that the lesion be unilateral. Secondly, the diagnosis should be made and treatment instituted before irreversible changes have taken place in the opposite kidney and in the cardiovascular system.

Early recognition of unilateral lesions is essential. Except in cases of neoplasm the history usually dates back several years. If pyelitis or pyelonephritis in

infancy or early childhood is followed by persistent enuresis, frequency of urination, nocturia, dysuria, pyuria or hematuria, headache, disturbance of vision, nausea, vomiting or abdominal pain, singly or in any of the possible combinations thereof, the child should be investigated with scrupulous care. In addition to a complete physical examination, the investigation should include (1) careful determinations of the blood pressure during rest and sleep; (2) its response to specific stimuli; (3) repeated examinations of the urine, with cultures if indicated; (4) tests of renal function, and (5) roentgenograms of the urinary tract, including pyelograms after the intravenous, intramuscular or subcutaneous injection of diodast. If a suspected or obvious lesion of one kidney is apparent from these studies, the further investigation should include cystoscopy, ureteral catheterization, study of the urine from and the function of each kidney separately, and retrograde pyelography.

The same type of thorough investigation of the urinary tract should be carried out on all children with high blood pressure the cause of which is not readily apparent.

Determination of the systolic and diastolic pressures should be an integral part of the physical examination of every child. A moderate elevation of blood pressure found during a routine examination in the office must not be disregarded. Hypertension may appear insidiously and progress rapidly to a malignant phase. By diligent search for unilateral renal disease it may be possible occasionally to detect an early lesion and institute operative therapy before secondary malignant manifestations of the disease have occurred.

We do not agree with Schroeder and Fish¹⁴ that retinitis is a contraindication to operation in advanced

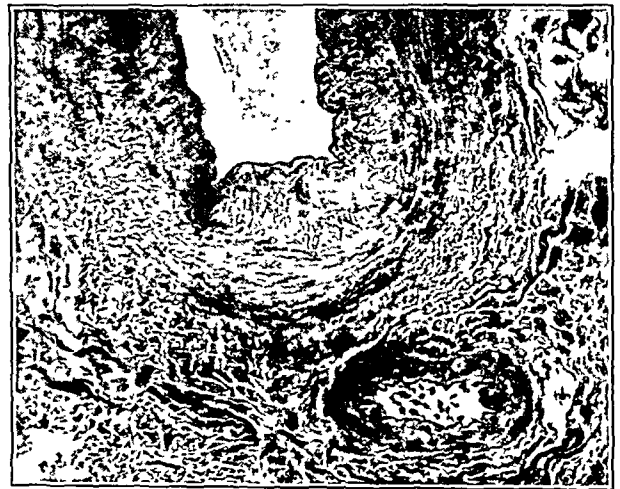


Fig. 7.—Section of a large branch of the renal artery. There is productive endarteritis.

stages but believe that any child, even though he appears to be in the terminal, malignant phase of hypertension, should have as complete a urologic investigation as possible and be treated surgically if definite evidence of unilateral renal disease is found, provided that the structure and function of the opposite kidney are essentially normal and provided further, that the child's general condition will permit the risk of a major operation.

9 Goldblatt, Harry, Lynch, J.; Hanzal, R. F. and Summerville, W. W. Studies on Experimental Hypertension. I. The Production of Persistent Elevation of Systolic Blood Pressure by Means of Renal Ischemia, *J. Exper. Med.* 59: 347-380 (March) 1934.

10 Butler, A. M.: Chronic Pyelonephritis and Arterial Hypertension, *J. Clin. Investigation* 16: 889-897 (Nov.) 1937.

11 Barney, J. D. and Suby, H. I.: Unilateral Renal Disease with Arterial Hypertension. Report of a Case Apparently Cured Following Nephrectomy, *New England J. Med.* 220: 744-746 (May 4) 1939.

12 Patch, T. S.; Rhea, L. J. and Codnere, J. T.: Hypertension in a Girl of Twelve, Associated with Unilateral, Atrophic Pyelonephritis: Treated by Nephrectomy, *Clinical Medicine* 43: 419-424 (Nov.) 1940.

13 Kennedy, Roger L. J.; Barker, N. W. and Walters, Waltman: Malignant Hypertension in a Child. Cure Following Nephrectomy, *Am. J. Dis. Child* 61: 128-134 (Jan.) 1941.

14 Schroeder, H. A. and Fish, G. W.: Studies on "Essential" Hypertension. III. The Effect of Nephrectomy on Hypertension Associated with Organic Renal Disease, *Am. J. M. Sc.* 199: 601-616 (July) 1940.

CONCLUSION

Juvenile hypertension may be secondary to unilateral disease of the kidney. The renal lesions may be classified as primarily neoplastic, obstructive, congenital or inflammatory.

A thorough investigation of the urinary tract should be carried out on every child with a previous history of pyelitis or pyelonephritis who has symptoms referable to the central nervous system, the cardiovascular system, the gastrointestinal tract or the genitourinary tract. The same investigation should be pursued in every case of unexplained juvenile hypertension.

If disease of one kidney is discovered the patient should be treated by operation provided the function of the opposite kidney is essentially normal and the general condition of the child is adequate for him to withstand surgical intervention.

With the exception of cases in which hypertension was secondary to renal neoplasm, the immediate results of operative treatment in all reported cases, including the one herein recorded, have been excellent. Too little time has yet elapsed for one to state with certainty that the hypertension in any case has been permanently relieved.

FIBROSIS AND SUBMUCOUS CALCIFICATION OF THE VESICAL NECK

GEORGE M. FISTER, M.D.

OGDEN, UTAH

The title of this paper is rather all inclusive; however, my object is to review fibrosis (submucous fibrosis) of the vesical neck in children and to report an unusual case of fibrosis with submucous calcification of the vesical orifice in a boy 13 years of age.

From a review of the literature it would appear that fibrosis of the vesical neck in children is a rare disease. Campbell¹ reported finding but 12 cases in the literature up to 1930. The disease may be more frequent than the reported cases would indicate, and at times this condition probably goes unrecognized until late in life. Young,² in a study of 355 adults with fibrosis of the bladder neck, found 20 cases, or 5.6 per cent, with a history of imperfect urination since childhood, which indicated that the obstruction to urination was probably congenital. Submucous calcification of the vesical neck in a child is a most unusual condition, and there is no reference to a similar case in the literature.

Fibrosis of the vesical neck is characterized by proliferation of fibrous tissue in the submucosa and into the muscle fibers of the internal sphincter. The resulting contraction of this fibrous tissue produces a contracture of the bladder neck. Fibrosis of the vesical neck is not necessarily synonymous with "median bar." Herbst³ considers "that the term 'median bar' should be applied to elevations which occur on the floor of the bladder from the immediate bladder neck to the edge of the trigon. While contracture or fibrosis of the vesical neck should be applied to those cases in which the entire circumference of the neck of the bladder is converted into fibrous tissue." It would seem, how-

ever, that one type of "median bar" is but a partial fibrosis of the vesical neck in which the fibrotic tissue appears only on the floor of the vesical orifice.

AGE

Fibrosis of the vesical neck may occur at any age. The disease may be congenital and produce symptoms in infancy, or the symptoms of the disease may not be pronounced until later in life. This would seem to indicate that the fibrosis is a progressive disease.

In Campbell's series of 41 clinical cases there were 7 patients under 1 year of age, and in 19 cases symptoms had been present since birth.

SEX

Fibrosis of the vesical neck is usually a disease of the male, but Campbell has reported 3 cases in females. Beer⁴ reported 2 cases in the female in over 30 clinical cases, and, in a series of 9 cases of contracture of the vesical neck reported by Caulk,⁵ 5 were in females.

ETIOLOGY

The exact etiology of fibrosis of the vesical neck in children is unknown. Since the disease is found in infancy, and since many adults with fibrosis of the vesical neck give a history of urinary difficulties dating from childhood, it seems probable that the obstruction may be congenital. In attempting to establish the etiology, one must keep in mind that the patients are usually seen late in the course of the disease and that the pathologic condition of the bladder neck as seen at the time the diagnosis is made may not represent the pathologic condition present at the onset of the disease.

The reported cases of fibrosis of the vesical neck can be divided into three groups, and although the apparently etiologic factors overlap there are certain characteristics about the patients in each classification. First are those that appear to be congenital and not associated with other congenital diseases affecting the urinary tract.

When one refers to congenital fibrosis of the vesical neck there is always the possibility that the fibrosis as such is not congenital but that it is secondary to other congenital defects of the vesical orifice. In this group must be considered congenital hypertrophy of the internal sphincter muscle, similar to congenital pyloric stenosis. It is also likely that some patients have a congenital partial atresia of the bladder orifice similar to that which occurs at the meatus, in the urethra or in other hollow viscera.

Herbst has reported a case of hypertrophy of the bladder neck with obstruction in a boy 9 months of age. The microscopic sections of the bladder neck showed no fibrous changes, but many of the muscle fibers contained vacuoles, probably an indication of beginning degeneration. It seems probable, as suggested by Herbst, that "the trauma produced at the neck of the bladder by months or years of imperfect urinary function, often associated with infection, convert these hypertrophic muscle fibers into fibrous tissue." Further suggestion that the disease may be congenital is found in Wilhelm's⁶ report of congenital median bars occurring in twin brothers.

In Campbell's reported series of contracted bladder outlet there were 7 cases in children under 1 year of age, which again would indicate that there is a con-

Read before the Section on Urology at the Ninety-Second Annual Session of the American Medical Association, Cleveland, June 5, 1941.

1. Campbell, M. F.: *Pediatric Urology*, New York, Macmillan Company, vol. 1, p. 353; *Submucous Fibrosis of the Bladder Outlet in Infancy and Childhood*, J. A. M. A. **94**: 1373 (May 3) 1930; J. Urol. **27**: 157 (Feb.) 1932.

2. Young, H. H., and Davis, D. M.: *Young's Practice of Urology*, Philadelphia, W. B. Saunders Company, 1926, vol. 2, p. 501.

3. Herbst, R. H.: *Fibrosis of Vesical Neck*, J. A. M. A. **91**: 1014 (Nov. 24) 1928.

4. Beer, Edwin: *Chronic Retention of Urine in Children*, J. A. M. A. **65**: 1709 (Nov. 13) 1915.

5. Caulk, J. R.: *Surg., Gynec. & Obst.* **62**: 80 (July) 1936.

6. Wilhelm, O. J.: *Congenital Median Bars Occurring in Twins*, J. A. M. A. **101**: 848 (Sept. 9) 1933.

genital factor responsible for this disease. But in the analysis of congenital fibrosis of the vesical neck one is inclined to consider the fibrous infiltration as implanted on congenital muscular hypertrophy, or atresia of the vesical neck.

The second group includes those cases in children in which the fibrosis of the vesical neck is associated with a neurogenic vesical dysfunction, as seen most frequently in spina bifida.

Mertz and Smith,⁷ in a series of 13 personal cases and 26 collected cases with posterior spinal fusion defects, found 34 with day or night urinary incontinence, associated with known bladder retention in 15. Of the 13 personal cases reported, a careful investigation of the urethra and vesical neck failed to disclose any mechanical factor causing obstruction; however, at operation a contracted vesical orifice was found in 1 patient. The authors concluded that the nerve dysfunction was due to pressure and was not caused by the bony hiatus alone.

In Campbell's series of 41 cases of contracture of the bladder outlet, spina bifida occulta was present in 6. In certain cases of spina bifida there are found disturbances of innervation of the urogenital organs and usually other neurotrophic changes involving the rectal sphincter and the lower extremities. The bladder disturbance depends on the extent of the interference with the nerve tracts and on the pathways involved, whether these are sympathetic, parasympathetic (pelvic nerve) or somatic (pubic nerve). The bladder disturbance will also be dependent on the involvement, whether it is unilateral, bilateral, motor or sensory and, as frequently happens, the dysfunction is of a mixed character. The neurogenic disturbances of the bladder may produce a spastic or hypertrophic internal sphincter muscle, but this condition is not identical with fibrosis of the vesical neck.

That spina bifida (with an associated neurogenic bladder disease) and fibrosis of the vesical neck may be found in the same patient is evident from the literature and from personal observations of the patient reported in this paper, but the relationship of the nerve dysfunction to the fibrosis is not quite clear. The question arises as to whether we are dealing with two congenital defects in the same child or whether the neurogenic disease of the bladder is simply one of the etiologic factors in fibrosis of the vesical neck.

As suggested by Beer, it may be in these cases that the fibrosis is a secondary change produced in a spastic internal sphincter associated with a neurogenic bladder. One must also consider that disturbances of vital cell metabolism or vascular changes caused by an interference with the nerve function may lead to a degenerative process which is followed by fibrotic changes.

The third group includes the acquired form of fibrosis of the vesical neck. This is much more common in adults than in children, the fibrosis usually being confined to the posterior region of the vesical sphincter, producing a fibrous bar. This type of contracture of the bladder orifice may have its origin in trauma or infections of the posterior urethra, prostate or possibly from distant foci. Groups 1 and 2 are most frequently seen in children, but group 3 may occur in late childhood, when there is an associated disease of the deep urethra.

SYMPTOMS

The symptoms are essentially those of bladder neck obstruction plus damage to the upper urinary tract and are dependent on interference with the opening and

closing of the internal sphincter and hypertrophy of the bladder musculature. The degree of obstruction determines the severity of the symptoms. Painful urination and incontinence are the essential symptoms, and, when the incontinence predominates, it often leads to the erroneous diagnosis of enuresis. Once the patient is labeled a "bed wetter," further investigation frequently stops and the disease remains untreated, such delay in treatment resulting in increased infection and kidney destruction.

As the disease progresses there may be retention of urine and pains in the lower part of the abdomen which radiate to the kidneys. Catheterization may be necessary but at times is impossible, owing to the tightness of the vesical opening. Chills and fever often accompany the kidney infection.

DIAGNOSIS

The diagnosis is arrived at by not overlooking the fact that children with pyuria, frequency, painful urination or enuresis may have an obstruction of the bladder neck. There are four diseases from which fibrosis of the vesical neck must be differentiated: stricture, congenital valves of the posterior urethra, hypertrophy of the verumontanum and a neuromuscular vesical disturbance.

The usual urologic examination and roentgenograms of the urinary tract will give an indication of the damage to the urinary tract, but the differential diagnosis rests primarily on the cystoscopic findings. Valves of the deep urethra and hypertrophy of the verumontanum can be visualized, and stricture is detected by urethrocscopy and the passing of bougies.

It is more difficult to differentiate fibrosis of the vesical neck from a neurogenic disease of the bladder. Roentgen ray evidence of spina bifida suggests a neuromuscular disease, and cystometric studies are a valuable aid in differentiating myogenic from neurogenic changes of the bladder.

An atonic bladder with residual urine having either a spastic or a relaxed vesical sphincter is the usual picture of a neurogenic disease.

In the presence of a fibrosis of the vesical neck, cystoscopy may be difficult. If the cystoscope can be passed to the bladder, there is felt a resistance at the internal sphincter accompanied by a "jump" as the cystoscope passes over the firm fibrous tissue. The changes in the vesical orifice as seen through the cystoscope will be dependent on the extent of the fibrosis. The portion of the outlet involved will appear as an elevated, firm, resistant ridge. If only the posterior area is involved there will be seen a so-called "median bar." When the fibrosis includes the entire bladder outlet there is a "rounded ridgelike collar intrusion" (Campbell). There are usually present a contracted bladder, with hypertrophy of the bladder wall and trigon. One must remember that fibrosis of the vesical neck and a neurogenic vesical dysfunction may be present in the same patient. On rectal examination there is often a palpable, firm, fixed area in the region of the fibrotic vesical neck.

PATHOLOGY

The pathologic conditions characteristic of this disease are those associated with obstructions of the bladder neck. The degree of urinary tract damage is dependent on the degree of the obstruction and the length of time the obstruction has existed. In most of the cases reported there was found hypertrophy of the bladder muscle, dilatation of the ureters with regurgitation and hydronephrosis or pyonephrosis with destruction of the kidney parenchyma. Many of the patients are moribund

7. Mertz, H. O., and Smith, L. A.: *J. Urol.* 24: 41 (July) 1930.

at the time the diagnosis is made, and postmortem findings are common.

The microscopic appearance of the tissue removed from the bladder orifice is usually that of a fibrous infiltration in a thickened submucosa. In some instances hypertrophy of the internal sphincter muscle is men-



Fig. 1.—Intravenous pyelogram made when the boy was 8 years of age. The urinary tract appears fairly normal, and there is no evidence of urinary calculi. There is failure of closure of the third, fourth and fifth lumbar and of the sacral vertebrae.

tioned. More frequently there is a degeneration of the muscle, and there is seen proliferation of fibrous tissue between the muscle fibers. Lymphocytes predominate in the cellular exudate, with no evidence of acute inflammatory changes.

TREATMENT

Dilations of the urethra, or diathermy administered through a sound as suggested by Lazarus, may relieve the symptoms in some patients, but after proper pre-operative preparation the treatment of this disease is



Fig. 2.—In this plain roentgenogram, taken at the time the patient was admitted to the hospital, there is seen a shadow just posterior to the symphysis pubis.

surgical removal of all or part of the obstruction. In children this is usually best done through the open bladder, the excision of one or more wedge shaped pieces of fibrous tissues from the vesical orifice being sufficient. Postoperative dilations of the vesical orifice should be done.

REPORT OF CASE

History.—A white boy aged 13 years had been operated on four days after birth for a spina bifida cystica and the sac removed. Up until about 8 years of age there had been incontinence of both the rectum and the bladder. About this time he gradually acquired control of the rectum, but there was no improvement as regards the bladder. The urine dripped continuously, although at times the boy voided small amounts of urine. It was necessary for him to wear pads for protection of his clothing. His mental and physical growth was normal, except that the left leg and foot were smaller than the right.

When 8 years of age the boy was examined by his family physician for the enuresis. No evidence of urine retention was found. A roentgenographic study of the urinary tract showed no stone shadows, and the intravenous pyelograms showed both kidney pelves, the ureters and the bladder to be of fairly normal size and contour (fig. 1). The bladder was somewhat pear shaped, but the walls were smooth in outline. There was seen in the films a failure of closure of the third, fourth and fifth lumbar, and all of the sacral vertebrae. Atropine was prescribed, but the boy obtained no relief.



Fig. 3.—In the cystogram the shadow is seen to be outside the bladder. The walls of the bladder are smooth, and there is no evidence of regurgitation of the medium.

At the age of 11 (two years before the present illness) he experienced occasional pains in the penis and the bladder, and the urine did not "dribble" freely from the bladder. When he tried to urinate, the stream was very small and the pain was more intense. The pain gradually increased, there was marked straining on urination, and he used pressure on the abdomen "to force the urine out." There was still day and night incontinence, but the amount of urine seemed less and he used fewer pads.

For two weeks prior to admission to the hospital the patient had severe bladder and abdominal pain and he voided but small amounts of urine. He obtained some relief from the pain with hot baths and sedatives.

Examination.—The head, neck, chest and upper extremities were normal. The abdomen was normal except for a moderate suprapubic dullness, evidently from a distended bladder. The left leg and foot were smaller than the right and there was hyperdorsal flexion of the left foot. The right thigh and calf were $\frac{3}{4}$ inch larger in circumference than the left. Over the sacrum was an operative scar. There were loss of touch and superficial pain sensations on the inner aspect of both buttocks, but no other sensory changes were noted. Catheterization was difficult and painful. A number 8 Coudé catheter was passed and the residual urine was between 8 and 10 ounces (300 cc.).

The urine contained a trace of albumin; no sugar was present. The pH was 5.5, and microscopic examination showed 4 plus pus and a few red blood cells. Culture revealed a growth

of a nonhemolytic streptococcus. The blood Wassermann reaction was negative. The blood calcium was 11.5 mg. per hundred cubic centimeters. Blood count revealed hemoglobin 95 per cent, red blood cells 5,180,000, white blood cells 9,200. The phenolsulfonphthalein excretion (postoperative) first hour was 40 per cent and second hour 15 per cent, total 55 per cent.



Fig. 4.—In the intravenous pyelogram the upper urinary tract appears to be fairly normal. The bladder is smooth in contour. The shadow seen in the plain film is shown to lie outside the bladder.

On a plain roentgenogram (fig. 2) was seen a group of dense contiguous shadows forming a complete ring except in the anterior portion. The shadows had the density of vesical calculi and appeared to lie near the vesical orifice or within the prostate. However, the cystogram (fig. 3) showed the shadows to lie outside the bladder but apparently in the region of the urethrovessical junction. The bladder was of normal size and the wall was smooth. There was no evidence of diverticula or regurgitation of the medium up the ureters. The intravenous pyelograms (fig. 4) demonstrated a very mild degree of bilateral hydronephrosis. The function of both kidneys, as judged by the rate of excretion of the dye, was about normal.

There was some relaxation of the rectal sphincter. The prostate was not definitely palpable, but a very firm area was felt in the region of the prostate and vesical orifice.

There was an obstruction at the vesical neck which prevented the passage of either an infant size or a number 18 cystoscope to the bladder. With difficulty a woven catheter was again

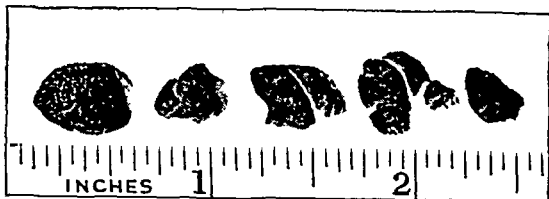


Fig. 5.—Stones removed from the submucosa at the vesical neck.

introduced. No cystometric studies were made. Following this examination the patient had chills and fever for several days and there was increased difficulty in the expression of the urine.

Operation—A preoperative diagnosis of calcification at the urethrovessical orifice was made, and on Sept. 12, 1939 under gas anesthesia a cystotomy was performed. The bladder was above normal thickness. The mucosa was smooth but hypere-

mic. There were no stones in the bladder. The vesical orifice was extremely hard; the opening was small and would not permit the introduction of a finger tip. An incision was made through the thickened mucosa at the vesical orifice and a hard stone was encountered. A circular incision was then made around the orifice, and six bean sized stones were removed from both lateral and posterior submucosa (fig. 5). A V shaped segment was then excised from the floor at the urethrovessical junction. The prostate was not demonstrable.

The excised tissue showed a hyperplasia of the bladder epithelium with a thickened submucosa (fig. 6). There was a dense proliferation of the connective tissue which permeated the muscle fibers. In certain areas there appeared degeneration of both the connective and the muscular tissue. Fibroblasts were present, but lymphocytes predominated in the exudate and numerous plasma cells and eosinophils were seen. Throughout the tissue were small areas of calcification which were surrounded by fibrous connective tissue. Immature prostatic glands were present. Qualitative analysis of the removed stones showed calcium carbonate.

Postoperative Course.—During the twenty months since the operation the boy's progress has been good. Dilations of the vesical neck have been carried out, and at present a number 16 catheter passes to the bladder. The residual urine is less than



Fig. 6.—Section removed from the vesical neck. There is marked proliferation of the connective tissue with evidence of degeneration. There are also seen small areas of calcium throughout the tissue.

1 ounce (30 cc), containing some pus and bacteria. The boy has developed daytime control of the urine, is free from pain, and voids about every hour. A roentgenogram of the bladder reveals no evidence of stone.

COMMENT

In a summary of this case it seems important to emphasize that the patient had a neurogenic incontinence, but there are neither roentgenographic nor physical findings to indicate that there was present any large amount of residual urine until calcification developed with bladder neck obstruction. The calcification was an acquired condition and developed between the ages of 8 and 13.

It is concluded that the fibrosis of the vesical sac was a progressive disease and preceded the calcification. The fibrosis does not appear to have been incidental to muscular hypertrophy, since there was no hypertrophy of trigon, bladder wall or the internal sphincter. It may have been initiated by a disturbance of innervation of the sphincter followed by an acquired infection.

The patient gained control of the bowels at the age of 7 and, had not the fibrosis with calcification of the vesical neck occurred, he most likely would have gained some control of the bladder without the aid of surgery.

In the tissue removed from the bladder orifice there was present a dense proliferation of fibrous tissue with

muscle and connective tissue degeneration and deposits of calcium in the submucosa. One is inclined to consider the submucous calcification as a deposition of calcium in degenerative and inflammatory tissue which was preceded by the fibrous infiltration of the vesical neck. The calcification of the submucosa suggests some similarity to that which occurs in Mönckeberg's disease of the blood vessels, in which there is seen atrophy of the muscle elements and calcium deposits.

Similar calcification is also found in areas of tuberculosis that have undergone fatty degeneration, but in this patient there was neither clinical nor pathologic evidence of tuberculosis. The submucous calcification also suggests some similarity to so-called exogenous prostatic calculi. But the boy's prostate was immature and in the section of tissue removed from the vesical neck no calcification was seen in the prostatic tissue. There was found no suggestion of a diverticulum of the prostatic urethra in which the stones might have developed. Parathyroid disease as an etiologic factor in the calcification was considered, but there was no clinical evidence of such a disturbance.

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ABSTRACT OF DISCUSSION

ON PAPERS OF DRs. POWERS AND MURRAY AND DR. FISTER

DR. HERBERT B. WRIGHT, Cleveland: The paper presented by Drs. Powers and Murray emphasizes that the eye-ground changes are reversible and do not contraindicate treatment and that the disease must be unilateral to warrant surgical intervention. The proposition of removing the worse of two diseased kidneys in an effort to clear up hypertension is a distinct mistake. This paper adds another good case to the approximately 50 cases in adults and children whose unilateral renal disease was benefited by nephrectomy. One additional case of hypertension in a child is known to me through a personal communication of Dr. Goldblatt. A girl aged 12, a patient of Dr. Williams of Dallas, Texas, had a blood pressure of 260 systolic and 160 diastolic before nephrectomy two and one-half years ago, and ever since the operation she has had entirely normal levels between 120/80 and 110/70. Her case was also classified as a juvenile type of arteriosclerosis with pyelonephritis. Goldblatt feels it is conceivable that a unilateral nonfunctioning kidney in the human may produce hypertension, but proved cases of this sort of unilateral hydronephrosis causing hypertension in man have not been demonstrated clearly. There is a growing lack of respect for the "cold pressor" test as an aid in evaluating these cases. Elevations of blood pressure may be falsely obtained by reason of the excitement of the patient or of the physician. Cold pressor determinations made with the patient and the examiner on one side of a screen and the testing carried out on the other side are said to show results at considerable variance with previous conceptions. In evaluating psychologic factors in these cases of hypertension, the test proposed by Moore and advocated by Goldblatt seems the most valuable. It consists in taking a series of blood pressure readings while the patient is asleep under intravenous anesthesia. It is a simple procedure, easily accomplished and quite valuable. If the case is one of true hypertension there should be no large fall in the blood pressure during the anesthesia. If the blood pressure goes down appreciably and definitely while the patient is under the anesthetic, the surgical treatment of the hypertension should be abandoned because the elevation is largely psychologic. With regard to Dr. Fister's paper, I have looked the literature over carefully, talked to a number of urologists concerning this submucosal bladder neck calcification and agree that this case is probably unique.

DR. MARJORIE F. MURRAY, Cooperstown, N. Y.: In the cases found in the literature, those reported by Pincoffs and Bradley are of especial interest as among the earliest in which hypertension was relieved by an operative procedure. These children and the 1 reported by Koons and Ruch were found to

have Wilms's tumor associated with hypertension. Those operated on were relieved temporarily. Koons and Ruch's patient was living at the time of their report. The other cases that were found fall into certain definite groups. First those with hydronephrosis due to obstruction of the urinary tract reported by Bothe. Second, Leadbetter's case of congenital obstruction of the renal artery, in which hypertension was relieved by the removal of an ectopic kidney. Third, the cases reported by Butler, Barney and Suby, Patch, Rhea and Codnere, and Kennedy, Barker and Walters, in which chronic unilateral pyelonephritis was the underlying factor. Not one of these cases has been followed over a sufficiently long period to give one a feeling of assurance that the children will survive. The longest period of postoperative observation is of Bothe's patient, who has been followed for four and one-half years after nephrectomy and still has a normal blood pressure.

DR. GEORGE M. FISTER, Ogden, Utah: This boy was operated on Sept. 12, 1930, and since the operation he has had fair daytime control over urination. He urinates every one and one-half or two hours. Six months ago, the last time I catheterized him, there was about an ounce of residual urine. He still has bed wetting at night.

Clinical Notes, Suggestions and New Instruments

INFECTION OF THE GALLBLADDER BY GIARDIA LAMBLIA

HOWARD R. HARTMAN, M.D., FRANKLIN A. KYSER, M.D.
AND
MANDREY W. COMFORT, M.D.
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The frequency with which *Giardia lamblia* invades the biliary system and actually gains entrance to the gallbladder is still an unanswered question.

Clinical observations by ourselves and other workers¹ have definitely verified the fact that giardial organisms are often found in the B fraction of bile obtained by the Meltzer-Lyon technic of duodenal drainage. This fact does not prove, however, that the parasites actually do invade the gallbladder. Hollander² has pointed out that the hypertonic solution which is introduced into the duodenum to obtain the B fraction of bile causes liberation of fluid into the duodenal lumen and that this fluid may wash the giardial organisms from the deep crypts of the duodenal mucosa into the lumen and thus account for the presence of the parasites in the duodenal aspirate.

Reports of cases in the literature in which giardial parasites have been obtained from bile from the gallbladder at operation are rare. Smithies³ has reported 2 cases and Westphal and Georgi⁴ have reported 1. Calder and Rigdon⁵ have reported observations made at necropsy in 1 case in which the organisms were found in the contents of the gallbladder.

We report a case in which giardial organisms were found in the bile from the gallbladder at operation. We do not wish to convey the impression that the parasites were entirely responsible for the patient's symptoms, since the operative findings were extremely significant. We do feel, however, that the finding of the organisms in the gallbladder bile is significant enough in itself to merit publication of this report.

From the Division of Medicine, Mayo Clinic (Drs. Hartman and Comfort). Dr. Kyser is Fellow in Medicine, Mayo Foundation.

1. Boeck, W. C.: Giardiasis in Man: Its Prevalence and Relation to Diarrhea and to Gallbladder Disease, *Arch. Int. Med.* **20**: 134-158 (Jan.) 1927.

2. Hollander, Edward: *Giardia Intestinalis* Infection, *Arch. Int. Med.* **32**: 522-529 (Oct.) 1923.

3. Smithies, Frank: Parasitosis of the Bile Passages and Gallbladder: A Report on Thirty-Seven Instances of Protozoiasis and One Instance of Infestation by *Necator Americanus*, *Am. J. M. Sc.* **174**: 225-253 (Aug.) 1928.

4. Westphal, Karl, and Georgi: Ueber die Beziehungen der *Lamblia intestinalis* zu Erkrankungen der Gallenwege und Leber, *München med. Wehnschr.* **70**: 1080-1084 (Aug. 17) 1923.

5. Calder, R. M., and Rigdon, R. H.: *Giardia Infestation of Gallbladder and Intestinal Tract*, *Am. J. M. Sc.* **190**: 82-88 (July) 1935.

REPORT OF CASE

A white man aged 32, from Pennsylvania, reported to the Mayo Clinic complaining primarily of nocturnal pain in the upper right quadrant of the abdomen. He said that in 1938 he had taken a three months trip through several South American countries. In August 1940 he had been seized with severe pain in the right upper quadrant of the abdomen. This discomfort was relieved by a drink of whisky. Several hours later sharp severe pain had returned in the right upper quadrant and an hour later the patient vomited and then gradually improved. In September 1940 a similar attack occurred and in October 1940 diarrhea developed in which foul watery stools were passed which contained large droplets of fat. The first stool in the morning was usually formed, but all other stools passed during the day (usually two or three after each meal and at bedtime) were liquid. After having had diarrhea for seven days, the patient experienced severe pain in the right upper abdominal quadrant, which developed gradually, reaching maximal intensity in about forty-eight hours. The pain finally required the use of opiates for relief. The patient felt nauseated but did not vomit. After disappearance of the pain, residual soreness across the entire upper part of the abdomen persisted for about three days. The diarrhea disappeared after the first day of pain.

Since this attack in October of 1940 the patient had had almost identical attacks, once each month, until August 1941, at which time he came to the clinic. Occasionally, during an acute episode, fever would occur in which the temperature was as high as 100 F. Only during two or three recent attacks had the pain ever extended, and then only to the region about the right shoulder blade. Occasionally, between attacks, the patient would notice mild aching in the upper right abdominal quadrant, but it was never severe enough to limit his activity.

In April 1941 his physician at home found giardias in the duodenal contents and instituted a course of atabrine dihydrochloride with only temporary relief of symptoms. No follow-up examination of the stools had been made at that time. During the one year of his illness the patient had lost 40 pounds (18 Kg.). He had never been jaundiced and his history prior to the onset of the condition of which he complained was essentially unimportant. Except for the patient's father, who had diabetes mellitus, the family history was not significant.

The patient was well nourished. The blood pressure was 136 systolic and 88 diastolic, expressed in millimeters of mercury. The pulse rate was 78 and the temperature 99 F. The patient's head, mouth and throat, neck, heart and lungs were normal. There was slight tenderness in the right upper quadrant of the abdomen and the liver was palpable 3 cm. below the right costal margin. Rectal examination revealed no abnormality.

Laboratory studies revealed the blood to be normal in number of cells and concentration of hemoglobin, and the reaction to the flocculation test for syphilis was negative. The urine was normal. A roentgenogram of the thorax appeared to be normal. A cholecystogram revealed a nonfunctioning gallbladder. The value for blood sugar (fasting) was 103 mg. per hundred cubic centimeters; for serum amylase, less than 50 units. There was no lipase in the serum. Results of examination of the stool for parasites were unsatisfactory because of the presence of an excessive amount of fat. Analysis of the twenty-four hour fecal output revealed that 14.5 per cent (dried weight) was fat. Examination of the duodenal contents revealed the presence of *Giardia lamblia*.

A clinical diagnosis of chronic cholecystitis and chronic pancreatitis was made and surgical intervention was advised and permitted. At operation the gallbladder was found to be normal except for a very slight thickening of the wall. There were no adhesions, and the common and cystic ducts appeared to be normal. The gallbladder was aspirated, and giardial

parasites were found in the bile. Extensive edema was noted around the head of the pancreas, and a localized mass in the head of this organ appeared grossly to be an adenoma. Because of the marked inflammatory reaction around the pancreas, no additional surgical procedure was carried out except for removal of the appendix.

Except for a mild febrile reaction of several days' duration, the patient's recovery from the operation was uneventful. However, the distress in the right upper abdominal quadrant and loose stool continued. On the patient's dismissal from the hospital on the twenty-fourth postoperative day a course of atabrine, consisting of 0.1 Gm. administered three times a day for five days, was begun. At the end of the third day of this treatment all the patient's abdominal symptoms completely disappeared and his stools were free from the parasite. He was dismissed from the clinic with the knowledge that reinfection with *Giardia lamblia* might occur and he was advised to have his stools checked at frequent intervals.

COMMENT

Since atabrine is almost specific for *Giardia lamblia*,⁶ it is probable that the first course of this drug did free the patient of the parasites but that he again became reinfected after completing this course of medication.

It is difficult in this case to evaluate what part *Giardia lamblia* played in causing the patient's symptoms. It is possible that the abnormal condition in the pancreas could account for almost the entire clinical picture. However, since eradication of the parasite completely relieved the patient of all his symptoms, the importance of the presence of *Giardia lamblia* must not be underemphasized.

HEMATURIA FOLLOWING THE USE OF HEPARIN

EUGENE L. RICHMOND, M.D., WORCESTER, MASS.

Since the recent report of Crafoord and Jorpes¹ of Stockholm, Sweden, the use of heparin prophylactically to prevent the formation of thrombosis has been stimulated and accelerated. They reported the use of more than 30,000 doses of heparin given intravenously in from 50 to 100 mg. doses without fatality and without any apparent drawbacks. They conclude that "evidently the treatment is quite harmless."

The harmlessness of artificially producing a hemorrhagic diathesis by prolonging the coagulation time is not borne out in the case reported here. Massive hematuria with the use of heparin had not been reported previously. Ershler and Blaisdell² reported the first occurrence of hematuria in a patient with cavernous sinus thrombosis treated with sulfathiazole and heparin in whom the renal damage was not due to sulfathiazole crystals.

REPORT OF CASE

A girl aged 13 years was admitted to St. Vincent Hospital with a provisional diagnosis of acute appendicitis. For the past three months she had been complaining of irregular pain in the lower part of the abdomen with belching. Two days before entry acute pain developed in the right lower quadrant with nausea and vomiting which persisted to admission. The previous history and the family history were irrelevant and menstruation had not begun.

Examination of the abdomen showed moderate distention with complete rigidity and spasm below the umbilicus. There was considerable tenderness over the entire right side. There was a smooth, tender, globular tumor in the suprapubic region. This mass did not change in size or shape following catheteri-

6. Hartman, H. R., and Kyser, F. A.: Giardiasis and Its Treatment: A Clinical Study, *J. A. M. A.* **116**: 2835-2839 (June 28) 1941.

1. Crafoord, Clarence, and Jorpes, Erik: Heparin as a Prophylactic Against Thrombosis, *J. A. M. A.* **116**: 2831-2835 (June 28) 1941.

2. Ershler, Irving, and Blaisdell, Irl: Massive Hematuria Following Use of Heparin in Cavernous Sinus Thrombosis, *J. A. M. A.* **117**: 927-930 (Sept. 13) 1941.

zation. Rectal examination confirmed the impression that there was a solid tumor arising from the pelvis. Tenderness was exquisite. The temperature was 100.4 F., the pulse rate 100 and the respiratory rate 20. A blood count showed a normal number of red cells and 20,000 white blood cells of which 90 per cent were polymorphonuclear leukocytes.

The preoperative diagnosis was solid ovarian tumor with a twisted pedicle, probably a dermoid cyst.

Operation was immediately performed. There was a large amount of blood tinged fluid in the pelvis. The right ovary was replaced by a large solid tumor 15 cm. in diameter, dark and cyanotic with gangrenous areas at the periphery. There were three complete turns of the tumor on its pedicle. The fallopian tube was gangrenous throughout. A salpingo-oophorectomy was performed.

There was a solid thrombus in the right ovarian vein. The vein was dissected along the entire course of the thrombus, which extended to within 1.5 cm. of its union with the inferior vena cava, and excised. The vein was ligated at this point.

Pathologic examination showed chronic appendicitis, a dermoid cyst of the ovary with acute gangrenous inflammation, acute gangrenous inflammation of the tube and a thrombosed blood clot in a vein.

Owing to the proximity of the ligated end of the ovarian vein to the vena cava and the existing phlebitis, the possibility of an extension of the thrombophlebitic process and the development of pulmonary emboli appeared very real. Consequently, four hours after the operation a continuous intravenous infusion with physiologic solution of sodium chloride and 20 mg. of heparin was started.

The patient passed an uneventful night and when seen the following morning, twelve hours after the operation, seemed in good condition. She had not voided. Four hours later (twelve hours after heparinization was begun) she voided 450 cc. of dark, thick, apparently pure blood. This was accompanied by mild shock. The medication was discontinued at this point at which time 950 cc. of the solution had been absorbed and the coagulation time was seventeen minutes. One and one-half hours later she voided 300 cc. of clotted blood. She went into severe shock, with air hunger and a pulse rate of 160. There was only a slight staining of blood on the abdominal dressing, with no subcutaneous bleeding. While the abdomen was considerably distended and boardlike, there was no bulging or tenderness on rectal examination. The white blood cell count had dropped to 16,000 per cubic millimeter and the red cells to 2,800,000.

An indwelling catheter was inserted into the bladder and hourly irrigations were done to prevent blood clots collecting in the bladder. She was immediately given a transfusion and rallied quite promptly from the shock. Irrigations of the bladder continued to show gross blood for twelve hours after the administration of heparin was stopped. The following day the coagulation time fell to five minutes and there was no further hematuria. After removal of a moderate hematoma at the site of the operation five days later convalescence was uneventful and the patient was discharged on the twentieth postoperative day.

CONCLUSIONS

The intravenous use of heparin produces a prolongation of the clotting time and is effective against the postoperative formation of thrombosis.

The case reported here with its massive renal bleeding would indicate that the treatment is not "harmless," although permanent damage was not done. The clotting time returned to normal when the drug was discontinued, and the hematuria stopped.

It is conceivable that hemorrhage in other areas of the body would cause more serious sequelae.

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Special Articles

THE FIELD OF INDUSTRIAL OPHTHALMOLOGY

A REPORT BY THE COMMITTEE ON INDUSTRIAL OPHTHALMOLOGY OF THE SECTION ON OPHTHALMOLOGY OF THE AMERICAN MEDICAL ASSOCIATION

ALBERT C. SNELL, M.D., ROCHESTER, N. Y., CHAIRMAN;
ARTHUR CULLER, M.D., DAYTON, OHIO, AND HEDWIG S. KUHN, M.D., HAMMOND, IND.

The medical profession has always based the main reason for its existence on the trained service which it renders to all who make up our complex citizenship. At this time, when industrial production is important in defense, it is peculiarly fitting that individual members of our profession and its organizations take time to consider whether or not this reason for existence is being satisfactorily fulfilled in all fields. Does this service reach all classes of the population or is there need in some fields for a more realistic distribution of skilled medical services? Do the medical societies and the individual members live in a "sort of economic vacuum untouched by the pressing social and economic issues of the day," as stated in an editorial?¹

So far as the practice of ophthalmology is related to the needs of industrial workers we find that there is a vacuum—an open gap—between the service which the competent ophthalmologist, restricted to office practice, is prepared to offer and the ophthalmic needs of the ordinary industrial worker who is not brought to this office. This vacuum is due to economic reasons or because of lack of understanding of the need of employees for this service. This gap or vacuum should be eliminated.

Because of the many complex problems that can be visualized by those interested in all phases of industrial ophthalmology and because there is an apparent need for developing a practical program of visual testing and correction to aid industry in the placement of its employees, the Council on Industrial Health of the American Medical Association suggested last year that a committee on industrial ophthalmology be appointed by the Section on Ophthalmology of the American Medical Association and that the Academy of Ophthalmology and Otolaryngology be asked to cooperate by the appointment of a joint committee. This committee has now been appointed and much preliminary work has been done. This paper is a preliminary report of this committee.

In order to present a partial picture of the need of further ophthalmic services to industrial employees attention is called to some aspects of the field of industrial ophthalmology, to the literature apposite to this theme and to an outline of a possible program of service which will meet any special need that may be revealed.

The scope of industrial ophthalmology should encompass the entire field of the visual functions of employees

Read before the Fourth Annual Congress on Industrial Health, Chicago, Jan. 13, 1942.

This report is abbreviated in THE JOURNAL by the omission of the bibliography. The complete report appears in the reprints.

1. Bulletin of the Medical Society of the County of Westchester, Sept. 15, 1941.

as these functions relate to industrial production. To illustrate the scope of this broad field, we point out that the field of industrial ophthalmology may conveniently be divided into five separate parts, although all of these are interrelated. These parts are (a) the efficient use of vision in industry; (b) eye accidents—their prevention and the treatment of injuries; (c) conservation of visual health (other than that relating to accidents)—its relation to general health and the relation of general health to efficient vision; (d) visual economics—the effect of vision on earning ability and on production, and (e) medicolegal ophthalmology—its relation to compensation for eye injuries and to protective insurance, liability and the like. In this preliminary paper we shall discuss at some length only the first of these five topics, since “the efficient use of vision in industry” is the most neglected part of the field of industrial ophthalmology. We shall merely call attention to “eye accidents” and omit all consideration of the three other topics.

The field of eye accidents includes the important program of accident prevention and the proper treatment of eye injuries. Much has been written and much effort is being constantly expended in this field. But let us point out briefly that, although during the past twenty-five years much progress has been made in the field of protecting employees' eyes from industrial eye hazards, nevertheless the average number of eye injuries has not been materially reduced. This may be explained by an increasing number of machine operators and machines. Three hundred thousand compensable eye accidents yearly are still taking place. These do not include trivial accidents such as uncomplicated injuries due to superficial foreign bodies in the cornea or conjunctiva. Ninety per cent of the serious accidents are preventable. There are in the United States 8,000 industrially blind and 80,000 employees blind in one eye due to industrial accidents. Special mention should be made of the importance of conferences between management and ophthalmologists in furtherance of a proper program in the use of protecting goggles, especially a type to be used over or in connection with correcting lenses. This phase of the goggle program has not been developed satisfactorily. Thus the program of the prevention of eye accidents is not working satisfactorily, and continued efforts must be directed constantly to programs of accident prevention.

In a review of the literature relating to the qualities of vision which are essential or important to industrial production, there could be found scarcely any reliable statistics which correlated all the various essential visual functions with efficiency of production in the many different and often complex jobs. In the few isolated surveys which were found, as a rule, these included data on only visual acuity; and visual acuity was usually tested without observance of recognized standards of measurement or of illumination. These surveys generally do not include any correlation between the quality of vision found and the visual requirements for specific types of jobs. There are some exceptions to these statements, among which should be mentioned the following: In England the Industrial Health Research Board and the Industrial Medical Research Council in cooperation with a committee on physiology² of vision (the chairman of the latter committee being Sir John J.

Parsons) have made a series of surveys giving special attention to the visual needs of workers in various industries. In the United States comprehensive surveys have been made during the past two years by Prof. Joseph Tiffin of Purdue University and his co-workers³ and also by Dr. Hedwig S. Kuhn.⁴ Some parts of the data of these surveys have been published, but much of the latter data has not been analyzed completely and the important facts have not all been revealed. These data are now being thoroughly analyzed and correlated. For those who desire to undertake a more complete study of the literature bearing on the field of industrial ophthalmology a bibliography is appended in the reprints.

The part of the field of industrial ophthalmology that has been neglected most is that which relates to efficient visual performance. This is an intricate but important part. It includes an understanding of all the visual functional factors that are essential to proper visual performance in every kind of job. The study of visual efficiency includes the following topics:

1. Basic elements of visual performance; the need of standards for essential functions of vision for specific jobs.
2. Methods and technics of testing.
3. Ways and means for correcting visual defects.
4. Placement of employees according to visual qualifications.
5. Health factors that influence vision.
6. Programs of cooperation between management, employees, industrial medical departments and ophthalmologists in establishing practical methods of visual testing, correction and placement.

1. *Basic Elements of Visual Performance.*—That some amount of vision is essential to efficient production is taken for granted, but that all jobs do not require the same quality of vision or of perfection of function is not generally comprehended. For example, color vision is not essential for most jobs but is essential for some. It is nonessential for the typist, saleswoman or common laborer but is essential for the railroad engineer and the textile employee who matches colors. Identical degrees of visual acuity are not demanded for every job (fortunately, since not every employee has perfect standard acuity); also, the powers of visual perception and other functions are not employed at the same distance in all jobs. Many employees use their eyes at a working distance of 14 to 20 inches, while others are employed at unusually short or unusually long distances. Examples of those who work at unusually short distances, often at a distance of 6 to 10 inches, are the loopers in the textile industry, inspectors and employees working on fine mechanical parts; examples of those who use their eyes at unusually long distances are the crane operator and the hoisting engineer. In other occupations both near and distant vision are employed alternately. In some jobs the quick and accurate judgment of distance is a most important function; for example, pressmen and those feeding moving machines. Such jobs demand a high degree of muscle balance and of depth perception.

Only a small proportion of eyes function perfectly. Therefore, it is plain that there is need to use such perfection of various qualities of visual function as can be found or developed, in order that all employees may

2. Weston, H. C., and Adams, S.: Industrial Fatigue Board, Reports 40, 49 and 57, London, His Majesty's Stationery Office, 1928-1929.

3. Tiffin, Joseph, and Rogers, H. B.: The Selection and Training of Inspectors, Personnel, vol. 18, number 1.

4. Kuhn, H. S.: An Appraisal of Visual Defects in Industry, Tr. Am. Acad. Ophth. 1940, p. 208.

find a useful place in industry. It should be noted that many specific jobs do not require the highest degree of perfection in all the essential functions of vision in order that these jobs may be efficiently performed. Moreover, since there are many common defects in vision which are correctable, it is obvious that industrial efficiency can be augmented by the institution of a program of detection and of correction of visual defects. But after the best correction there will remain many employees whose vision is still not perfect. Two per cent of the male population is color blind. One of us (A. C. S.) has estimated that 400,000 employees in the United States are amblyopic in one eye, the acuity in the poorer eye being less than 20/40. Thus it must be apparent that standards of the various essential qualities of vision must be established for a large variety of specific occupations in order that employees may be placed in jobs consistent with the degree and quality of their vision and that the job selected may be done efficiently. To establish these standards, it will be necessary to classify jobs in broad main groups with listing of jobs under each, based on a determination of the minimum visual requirements for each job classification. Such standards have not been established generally.

The essential factors of vision for which the industrial ophthalmologist must have standards for efficient production are (a) visual perception (visual acuity) both for distance and for near, (b) muscle coordination—muscle balance both for distant and for near vision, accommodation and convergence, (c) stereopsis and depth perception, (d) color vision.

To solve the problem of establishing reasonable standards for these functions of vision ophthalmologists should have a first-hand knowledge of the demands which industry makes on vision in all ordinary processes of production and also the special demands made by unusual kinds of employment. This involves a study of occupations. As a corollary to these standards of vision the ophthalmologist must be prepared also to advise proper standards of equipment which are essential for efficient visual performance. For example, he should investigate the most adequate illumination, proper ventilation and suitable chairs. For unusual types of employment, standards to indicate the best correcting lenses which are suitable both to the individual and for the specific job must be considered. The latter point suggests the problem of finding the most suitable occupational lenses for use in special occupations, a subject not generally considered. Thus the problem of establishing acceptable standards which take into consideration all factors that influence the various functions of vision and the specific visual requirements necessary to efficient production, depending on the peculiar nature of specific jobs, is complex. The problem must be solved by fixing standards which, by their employment, will make the most efficient use of all visual functions possessed by employees.

2. Testing of Visual Functions.—Satisfactory methods for testing vision are in common daily practice when patients are examined in the offices of ophthalmologists; but the problem of testing vision as it relates to industrial employment centers in the fact that employees, *en masse*, do not and cannot avail themselves of the opportunity of visiting ophthalmologists. Often neither the worker nor the management comprehends the need

for an ocular examination, and there is at present no satisfactory and practical method of testing the vision of employees in the various plants.

To be satisfactory, the method must be a simple, uncomplicated one; it must be inexpensive in time and money both for the employer and the employee; it should be done at the plant; it must screen out those who probably have defective vision from those who are visually efficient. A satisfactory method should accomplish the testing without the necessity of complicated equipment, and it should be made by some trained nonmedical person but under the supervision of physicians, preferably by the medical department at the plant. Where this does not exist some medical man should be made responsible for carrying out a predetermined program. There is no substitute for a thorough examination of the eyes in the office when this is indicated, but since surveys show that about 20 per cent of employees have defects which require examination and correction the primary step is that of uncovering those employees who do not need the complete examination. The plants that have a medical department and a competent ophthalmologist on their staff are most fortunate. However, many of the smaller plants have no such organizations, and even in the larger plants visual testing as a rule is not done satisfactorily. The technic which will embody all the desirable factors mentioned is now being developed and checked for dependability, by comparison with other accepted methods of visual testing. We believe that this phase of our problem is well on the way to a satisfactory solution.

3. Ways and Means of Correcting Visual Defects.—

There seems to be no one way by which the final examination can be made to the satisfaction of all interested parties. Since visual efficiency means productive efficiency which is a saving in cost of production, it would seem that industry should set up an organization to carry out a complete program, from supplying the technician to doing the testing, obtaining an ophthalmologist to determine the proper correcting lenses or treatment and, finally, supplying lenses, when needed, through an optician located at the plant. Such an organization is ideal but not often possible, and other means must be employed. An ophthalmologist on part time or on a fee basis can usually be found who will cooperate with the management in making the necessary final examinations. The glasses can be furnished through a contract with an optician to be paid for either by the management or by the employee. In every industrial plant, large or small, a satisfactory method can be worked out for a complete service. Ways and means for correcting visual defects, including the fitting and supplying of suitable lenses, can be found. When requested, any reliable ophthalmologist will cooperate.

4. Placement of Employees.—With the qualities and degrees of visual function of each employee determined and with other data—medical, personal and psychologic—in the hands of placement personnel, the job of placement of each employee can be carried out on a fairer and more scientific basis than can the hit and miss, trial and error method of placement in common use. So far as vision alone is concerned, jobs for all employees should be found which are suitable for the visual function

possessed by the employee. This concept implies an understanding of "jobs for the eyes" and "eyes for specific jobs." Placement of employees with the application of this concept is not universal. If our contemplated program can be developed and adopted, we believe that there will be not only an increase in production efficiency but also an improvement in the health, contentment and happiness of employees.

5. *Health Factors and Vision.*—The state of one's general health directly affects visual health and efficiency and, vice versa, visual health has a direct influence on general health. Space and time do not allow of further elaboration of this statement. It is made here to call attention to the intimate connection between vision and health. Also there are problems of housing, recreation, domestic relations and nutrition which have a bearing on health and which need further consideration. At the present time much investigation is being made to discover the influence that vitamins may have on general health and particularly on visual efficiency, but no satisfactory conclusion has been arrived at.

6. *The Program.*—To carry out a satisfactory program of testing, examining and correcting of visual defects, there must be complete coordination of activities between management, employees, medical departments, ophthalmologists and opticians. When the value of a completely coordinated program is comprehended, the desired cooperation between all interested parties will not be difficult to secure.

The members of the joint committee of the Section on Ophthalmology and the Academy of Ophthalmology and Otolaryngology are making a comprehensive study of all phases of the many details of the problem of the broad field of industrial ophthalmology. In the near future this committee hopes to develop a program which will close the gap between the ophthalmic needs of industrial employees and an adequate service to them.

The program visualizes (1) a further investigation of accident prevention and health factors influencing vision, (2) a study of illumination and other important equipment which are aids to efficient vision, (3) a plan of cooperation with educational institutions by which preoccupational shop training may be suited to the vision of the student or apprentice, (4) a study of rehabilitation possibilities and occupational eye wear, (5) the establishment of standards of vision based on job requirements, (6) the grouping of types of employment which can be followed efficiently with minimum standards of vision and (7) the development of a new technic of examination by nonmedical persons.

CONCLUSIONS

Medical practice in the field of industrial ophthalmology presents peculiar phases distinct from the usual practice of ophthalmology.

The social and economic status of industrial employees should be taken into consideration in planning any program of ophthalmic service.

The Committee on Industrial Ophthalmology is making progress with a program of visual testing and correction which, we hope, will be acceptable to management, to employees and to ophthalmologists.

This program aims to close the existing gap between the industrial workers who need medical care of eye defects and those qualified to render satisfactory ophthalmic service.

INDUSTRIAL DERMATOSES

A REPORT BY THE COMMITTEE ON INDUSTRIAL DERMATOSES OF THE SECTION ON DERMATOLOGY AND SYPHILOLOGY OF THE AMERICAN MEDICAL ASSOCIATION

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In the presentation of this report to the fourth Annual Congress on Industrial Health it seems appropriate to describe in a few words the organization and program of the Committee on Industrial Dermatoses. In the several years preceding 1936 there had been an increasing interest in the cutaneous manifestations arising from occupational exposures, and a need for a central clearing house of information on this subject had become more and more apparent. Therefore, at the meeting of the Section on Dermatology and Syphilology of the American Medical Association in 1936 a committee of five dermatologists interested in the subject was created. Shortly after this meeting a similar committee was formed in the American Dermatological Association and a small sum appropriated for expenses. Having common interest in these diseases due to occupational factors, members of the two committees have jointly carried out the original intent of cooperative consideration of industrial dermatologic problems. They have met and acted annually or oftener at various meetings of national associations.

In the beginning, the committee, through the Section on Dermatology and Syphilology, played a prominent part in the development of the Council on Industrial Health. The creation of the Council marked the attainment of one of the primary objectives of the committee in regard to the establishment of the central clearing house of information mentioned. It had been hoped that a dermatologist would be a member of the Council. In view of the fact that 65 per cent or more of industrial disease concerns the skin. In fact, Dr. Earl D. Osborne of Buffalo was an original member until pressure of other work forced him to give it up.

In 1937 the committee sponsored a symposium on occupational dermatoses at the meeting of the American Medical Association in San Francisco and also at the annual meeting of the American Dermatological Association. The papers presented at these two meetings have been collected and bound in one convenient volume by the American Medical Association in order to make them more readily accessible. At this session a discussion of improved standards of teaching occupational dermatology was initiated, and during the past year a questionnaire on this subject has been sent out to all medical schools in the country. This survey is practically completed, and a report with recommendations will be issued very soon. Discussion was also begun on acceptable definitions of an occupational dermatosis, a primary skin irritant, criteria for diagnosis of an occupational dermatosis and determination of disability.

Since these early discussions there has been steady growth in interest in the subject of cutaneous problems

in industry, not solely on the part of dermatologists but by industrial physicians and in the general medical profession as well. The reasons for this interest in these problems can be stated as follows:

1. In at least 15 per cent of all patients with cutaneous disease an occupational factor must be considered.
2. Disability due to occupational dermatoses is increasing.
3. Much of this disability could be prevented by early detection and adequate preventive measures.
4. New causal factors are constantly being introduced into the picture.
5. Numerous workers with dermatoses are granted compensation and others are deprived of compensation on inadequate data.
6. Opportunities for well rounded instruction in the subject are scarce.

These immediate problems requiring solution have made it imperative that the committee be continued as a permanent one in order to continue these specific lines of investigation.

The committee has met with the officers of the Council on several occasions. Out of these conferences have developed the industrial dermatoses bulletins, which appeared first on March 1, 1941. These bulletins have served as a most satisfactory medium for exchange of ideas between members of the committee and the Council.

RECENT DEVELOPMENTS

Results of work already accomplished will best be described in the following series of definitions and criteria, which have been thoroughly discussed, agreed on by the full membership of the committees and submitted to the Council on Industrial Health for adoption and publication.

1. *Definition of an Occupational Dermatitis.*—In 1939 the committee adopted the following definition of an occupational dermatosis:

An occupational dermatosis is a pathological condition of the skin for which occupational exposure can be shown to be a major causal or contributory factor.

2. *Definition of a Primary Skin Irritant.*—When a substance in a given concentration, in a given vehicle and in a given manner and length of exposure produces a clinically manifested irritation on the skin of a majority of persons not previously sensitized to that substance, that substance is a primary irritant under the specified conditions. This irritation may be redness, papulation, vesiculation, ulceration or other sign of damage at the site to which the substance has been applied.

By contrast, substances which produce reactions only on the skin of persons who are hypersensitive to that substance are not primary irritants. A sensitizing agent is one which increases the capacity of the tissue to react to subsequent exposure.

Hypersensitivity means having a greater capacity to react than the norm.

Other circumstances operative in determining the irritant action of a given substance are numerous and complicated and therefore difficult to incorporate in an all inclusive definition. The following may be mentioned: the region of the cutaneous surface exposed; the physiologic state of the skin with reference to dryness, oiliness, perspiration and degree of pigmentation—the skin of the white race contrasted with that of the black, brown and yellow races; the action of two substances in combination, each of which alone does not

exert an irritant action; the size of the area exposed to the irritant; whether the area exposed to the irritant is subsequently covered or exposed to air. Still other factors may be operative; for example the general state of health, the emotional background and the influence of season, diet and actinic rays.

3. *Criteria for the Diagnosis of Occupational Dermatoses.*—The Committee on Occupational Dermatoses submits this statement of the criteria for the diagnosis of occupational dermatosis with the purpose of improving the proper interpretation of manifestations on the skin resulting from occupational causes. In so doing, the committee realizes fully the inadvisability, as well as the impossibility, of establishing arbitrary standards for determining the causal relationship between the occupational exposure and the abnormal condition of the skin in every individual case.

The lapse of time between exposure and examination, the inability to obtain an accurate history, the previous treatment, the combination of occupational and non-occupational cutaneous disease and various other factors prevent the application of any criteria in certain cases. It is also realized that all the suggested criteria will not fit every individual case, that new causal factors will continually be introduced in industrial processes and that new, or at least unusual, manifestations on the skin may be caused by agents in use at the present time. However, a careful weighing of the evidence obtained by detailed history and examination in the light of these standards should aid in the interpretation of the occupational relationship.

In the majority of cases of occupational dermatoses, the following criteria will usually be found to apply:

- (a) The dermatologic diagnosis is a dermatosis in which the role of an occupational causal (major or contributory) factor has at some previous time been established beyond reasonable doubt.
- (b) The person has been working in contact with an agent known to have produced similar changes in the skin.
- (c) The time relationship between exposure to the agent and the onset of the dermatosis is correct for that particular agent and that particular abnormality of the skin.
- (d) The site of the onset of the cutaneous disease and the site of maximum involvement are consistent with the site of maximum exposure.
- (e) The lesions present are consistent with those known to have followed the reputed exposure or trauma.
- (f) The person is employed in an occupation in which similar cases have previously occurred.
- (g) Some of the person's fellow workers using the same agent are known by the examiner to have similar manifestations due to the same cause.
- (h) So far as the examiner can ascertain there has been no exposure outside of occupation which can be implicated.
- (i) If the diagnosis is dermatitis, the following items are important:

- (1) Attacks coming after exposure to an agent, followed by improvement and clearing after cessation of exposure, constitute most convincing evidence of the occupational factor as a cause.
- (2) The results of patch tests performed and interpreted by competent dermatologists corroborate the history and the examination in the majority of cases.

As previously indicated, these criteria are difficult of application in certain groups of cases: (a) cases in which there is sensitization; (b) cases in which there is accentuation of existing cutaneous disease by occupational factors; (c) cases in which there are supervening

complications of other dermatoses and occupational dermatoses; (d) cases in which much time has elapsed between the development of the dermatosis and the examination, and (e) cases in which there has been overtreatment.

The committee has voted to adopt these criteria and submit them to the Council on Industrial Health.

PRESENT PROGRAM

The committee is undertaking four separate investigations at the present time:

1. *Teaching of Occupational Dermatoses in Medical Schools.*—Questionnaires have been sent out to all class A medical schools in the United States and Canada and the majority of them have been returned and are being tabulated. On the basis of these questionnaires it will be possible to make appropriate recommendations to professors of dermatology throughout the country regarding improved teaching in this subject.

2. *Primary Skin Irritants and Patch Testing.*—Assistance has been asked from dermatologists and industrial physicians about primary skin irritants and patch testing. The replies are now being studied as a means of evaluating patch testing and the creation of lists of primary skin irritants. As soon as these lists have been completed, individual chemicals will be submitted to members of the committee for testing.

3. *Evaluation of Protective Creams and Detergents Used in Industry.*—The problem of evaluating protective creams and detergents has been presented to the committee, and a subcommittee consisting of Dr. Earl Osborne, Dr. Joseph Klauder and Dr. Marion Sulzberger has been appointed to consider the matter. It is likely that the Council on Pharmacy and Chemistry of the American Medical Association will act as a collaborating agency, since if there is to be any regular appraisal of these substances by an official agency it should be in keeping with the rules of that council.

4. *An Industrial Medical Formulary.*—An industrial medical formulary is planned which will contain, among other things, a series of recommendations which would describe authoritatively the desirable qualifications of products to be used in the prevention or medical management of cutaneous exposures in industry. The availability of such a formulary in industrial dispensaries, it is thought, will aid greatly in the early detection and prevention of unhealthful cutaneous exposures and will prevent the use of agents or substances which might be harmful to the skin. A subcommittee consisting of Drs. Edward A. Oliver, Charles C. Dennie and Harold N. Cole has been appointed to take this matter under consideration.

Another project which is under development is the establishment of machinery for the receipt, proper filing and distribution of case reports on interesting and important cutaneous exposures in industry. This information, according to present plans, will be filed in the office of the Council on Industrial Health in accordance with the original clearing house idea. Proper standards for the presentation, acceptance for filing and publication of these case reports are now being formulated.

The members of the Committee on Occupational Dermatoses are all actively interested in the subject of cutaneous hazards in industry and their local and systemic effects. They pledge their full cooperation with the work of the Council.

RECOGNITION OF EARLY NUTRITIONAL FAILURE IN INFANTS, CHILDREN, ADOLESCENTS AND ADULTS

TENTATIVE CLINICAL CRITERIA FOR PHYSICIANS:
COMPLETE LIST OF SYMPTOMS AND SIGNS
CLASSIFIED ACCORDING TO PERSONS
CAPABLE OF OBSERVING THEM

THE PROBLEM

It is admitted a priori and as the basis for recommendations by this subcommittee that "early nutritional failure"—early deficiency states—is probably far more prevalent among the population of the United States than is generally recognized. Studies in various parts of the country of urban and rural groups strongly suggest that malnutrition is a problem of some social and economic importance in all areas investigated.

Symptoms and Signs Suggestive of Early Deficiency States in Infants and Children

Symptoms	Physical Signs
1 Lack of appetite (L)	1 Lack of subcutaneous fat (N)
2 Failure to eat adequate breakfast (L)	2 Wrinkling of skin on light stroking (N)
3 Failure to gain steadily in weight (L)	3 Poor muscle tone (D)
4 Late period of sitting, standing, walking (N)	4 Pallor (N)
5 Aversion to normal play (L)	5 Rough skin (toad skin) (N)
6 Chronic diarrhea (L)	6 Hemorrhage of newborn (D)
7 Inability to sit (L)	7 Bad posture (L)
8 Pain on sitting and standing (L)	8 Nasal blackheads and whiteheads (N)
9 Poor sleeping habits (L)	9 Sores at angles of mouth, cheilosis (L)
10 Backwardness in school (L)	10 Rapid heart (N)
11 Repeated respiratory infections (L)	11 Red tongue (D)
12 Abnormal intolerance of light, photophobia (L)	12 Square head, wrists enlarged, rib beading (N)
13 Abnormal discharge of tears (L)	13 Vincent's angina, thrush (D)
	14 Serious dental abnormalities (N)
	15 Corneal and conjunctival changes—slit lamp (D)

L, those which parents or teachers might observe.

N, those which nutritionists or nurses might observe.

D, those which physicians only would be expected to observe. The physician would take into account all other symptoms whether or not they have been previously observed.

The relation of diet and specific food factors to frank florid deficiency disease has been established, and satisfactory clinical and laboratory criteria for diagnosis have been defined. This aspect of the problem is being satisfactorily studied in a number of areas well scattered geographically. The basic current problem is clearcut: there is imperative need for (a) determination of the actual incidence of early deficiencies among the general population and for (b) the establishment of satisfactory diagnostic criteria for the recognition of such conditions.

The dietary habits of the people and the staple foods available vary in different sections of the United States. Correlating with this is the fact that investigators working in different areas are not in agreement concerning either the incidence or the interpretation of the indications pointing to nutritional failure. This may be explained by lack of uniformity in the methods for

Additional copies are available from the Nutrition Division, Office of Defense Health and Welfare Services, New Social Security Building, Washington, D. C.

Prepared by the Subcommittee on Medical Nutrition, Division of Medical Sciences, National Research Council. The subcommittee includes Dr. Thomas T. Mackie, chairman; Dr. Joseph S. Wall, 1864 Wyoming Avenue, Washington, D. C.; Dr. Julian Ruffin, Duke University School of Medicine, Durham, N. C.; Dr. Tom D. Spies, Hillman Hospital, Birmingham, Ala.; Dr. V. P. Sydenstricker, professor of medicine, University of Georgia School of Medicine, Augusta, Ga., and its collaborators, Dr. Norman Jolliffe, New York University School of Medicine, New York, and Dr. W. H. Sebrell, National Institute of Health, Washington, D. C.

identification and classification used by different workers, by local differences in dietary habits and environment or by the two acting concurrently.

Evaluation of the problem is still further complicated by the lack of sufficient, entirely dependable and practicable chemical methods of analysis, by the varying application of presently available methods and by variations of technic in their use.

Despite these difficulties, it is the judgment of this subcommittee that the clinical criteria and objective methods of study presently available are sufficient to warrant much more intensive investigation of early nutritional failure than has as yet been attempted. It is the further judgment of the subcommittee that such intensive investigation, if properly planned and distributed, would yield data of social, economic and public health importance.

Symptoms and Signs Suggestive of Early Deficiency States in Adolescents and Adults

Symptoms	Physical Signs
1 Lack of appetite (L)	1 Nasolabial sebaceous plugs (N)
2 Lassitude and chronic fatigue (L)	2 Sores at corners of mouth, cheilosis (L)
3 Loss of weight (L)	3 Vincent's angina (D)
4 Lack of mental application (L)	4 Minimal changes in tongue color or texture (D)
5 Loss of strength (L)	5 Red swollen lingual papil lae (D)
6 History of sore mouth or tongue (L)	6 Glossitis (D)
7 Chronic diarrhea (L)	7 Papillary atrophy of tongue (D)
8 Nervousness and irritability (L)	8 Stomatitis (D)
9 Burning, prickling of skin, paresthesias (L)	9 Spongy, bleeding gums (L)
10 Night blindness (N)	10 Muscle tenderness, extrenities (D)
11 Abnormal intolerance of light, photophobia (L)	11 Poor muscle tone (D)
12 Burning or itching of eyes (L)	12 Loss of vibratory sensation (D)
13 Abnormal discharge of tears, lacrimation (L)	13 Increase or decrease of tendon reflexes (D)
14 Muscle and joint pains, muscle cramps (L)	14 Hyperesthesia of skin (D)
15 Sore bleeding gums (L)	15 Bilateral symmetrical dermatitis (D)
16 Tendency to bleed (N)	16 Purpura (D)
	17 Dermatitis, facial butterfly, nasal bridge, pericard, scrotal, vulval (D)
	18 Thickening and pigmentation of skin over bony prominences (D)
	19 Nonspecific vaginitis (D)
	20 Follicular hyperkeratosis of extensor surfaces of extremities (D)
	21 Rachitic chest deformity (D)
	22 Anemia not responding to iron (D)
	23 Fatigue of accommodation (D)
	24 Vascularization of cornea (D)
	25 Conjunctival changes (D)

Implicit in the definition of the problem and in the foregoing statements is the fact that no symptoms or physical signs can be accepted as diagnostic of early nutritional failure. Certain symptoms and physical signs, however, when verified by a competent physician and when other possible causes have been ruled out should be considered as significant indications.

Owing to differences in training and in the opportunities for observation by parents, teachers, nutritionists, nurses and doctors, the list of symptoms and physical signs have been divided into three groups. The first list includes those signs that might be observed by parents and teachers. The second list covers those symptoms and signs that can be observed by nutritionists and nurses as well as those given in the first list. The third list includes all symptoms and signs that should be observed by doctors as well as by parents, teachers, nutritionists or nurses. In the third, or complete, list, which is presented here, the letter following each symptom indicates the type of person who might be expected to observe that particular symptom.

Council on Pharmacy and Chemistry

REPORT OF THE COUNCIL

THE COUNCIL HAS AUTHORIZED PUBLICATION OF THE FOLLOWING REPORT.
AUSTIN E. SMITH, M.D., Acting Secretary.

ANNUAL MEETING OF THE COUNCIL ON PHARMACY AND CHEMISTRY

The Council on Pharmacy and Chemistry of the American Medical Association convened at the Association headquarters, Oct. 17-18, 1941. Those in attendance were Drs. David Barr, J. Howard Brown, S. W. Clausen, H. N. Cole, Morris Fishbein, E. M. K. Geiling, Theodore G. Klumpp, James P. Leake, Perrin H. Long, George W. McCoy, Stuart Mudd, E. M. Nelson, W. W. Palmer, William C. Rose, Elmer L. Sevringhaus, Torald Sollmann and Soma Weiss. In addition to the members of the headquarters staff there were present, either for certain discussions or during the entire meeting, Dr. Ernest E. Irons, Secretary of the Board of Trustees, Dr. Robert Herwick of the Food and Drug Administration and Dr. Harold Hansen of the American Dental Association.

Among the many items discussed were the following:

Oral Typhoid Vaccine.—For some time the Council has had the subject of oral typhoid vaccine under consideration, although no report has as yet been published. The Council meanwhile has accepted no preparation of this nature. Consideration was again given to the subject and attention was called to recently published material on the subject. The Council authorized preparation of a report on oral typhoid vaccine based on the thesis that its use is not to be recommended.

Omission of Drugs from N. N. R.—The Council considered a list of some twenty-three drugs the retention of which in N. N. R. was questioned. In some cases the Council decided that further evidence was needed to establish whether or not the drug should be retained. In these cases steps were initiated for the obtaining of such data. In the case of the following drugs omission was voted under the regular procedure, namely that, in the case of a class of drugs, they should be retained for the longest period for which any brand stands accepted; in the case of individual brands, until the end of the current period of acceptance. It should be pointed out that the period of acceptance for any product is three years. Under the foregoing conditions the following will be omitted:

1. Sodium Cacodylate.
2. Soliton
3. Erysipelas and Prodigiosus Toxins
4. Phlorizin
5. Sandalwood Oil Derivatives (accepted brands are Arlicol [Aster] and Santyl Bilhuber Knoll).

Action was postponed on the following in order that further consideration might be given:

1. Alumol.
2. Ampuls of Camphor.
3. Cresol
4. Digestive Enzymes
5. Scarlet Red
6. Triethanolamine.
7. Gelatin Compound Phenolized.
8. Liver Extract Abbott
9. Parresine.
10. Sodium Thiosulfate.
11. Acriflavine and Acriflavine Hydrochloride.
12. Acetyltannic Acid.
13. Ethylhydrocupreine and the brand Optochin Hydrochloride.
14. Dichloramine T.
15. Merbaphen.
16. Chlorinated Paraffin
17. Sulfonethylmethane.
18. Carbromol

Present Status of Aminophylline.—The Council reviewed the claims for usefulness of aminophylline and decided that a new report should be prepared.

Acceptance of Vitamin B Complex Preparations.—The Council voted to consider for inclusion in N. N. R. the following types of preparations containing mixtures of the components of the vitamin B complex:

1. Mixtures of pure thiamine, riboflavin and nicotinic acid which are provided in the recommended daily intake: 1 mg. of thiamine, 2 mg. of riboflavin, 10 mg. of nicotinic acid or simple multiples thereof.

2. Dry brewers' yeast having the following minimum vitamin content per gram: 0.12 mg. of thiamine, 0.04 mg. of riboflavin and 0.25 mg. of nicotinic acid.

3. A concentrate of the vitamin B complex from brewers' yeast as described under 2, providing in the recommended daily intake 1 mg. of thiamine (or a simple multiple thereof) and corresponding proportions of other known vitamins of yeast.

4. A concentrate of the vitamin B complex from liver containing in each gram not less than 0.25 mg. of riboflavin.

5. A concentrate of the vitamin B complex from brewers' yeast fortified with riboflavin and nicotinic acid and providing in the recommended daily intake 1 mg. of thiamine, 2 mg. of riboflavin and 10 mg. of nicotinic acid or simple multiples thereof.

6. A concentrate of the vitamin B complex from rice polishings fortified with riboflavin and nicotinic acid providing in the recommended daily intake 1 mg. of thiamine, 2 mg. of riboflavin and 10 mg. of nicotinic acid or simple multiples thereof.

Multiple Dosage Forms of Council Accepted Preparations.—During the last year or two there has been a growing tendency on the part of manufacturers to present increasing numbers of dosage forms of certain products, notably the vitamins. The Council discussed this situation and voted that unnecessary multiplication of dosage forms be declared undesirable. It was recommended that, where occasion arises, this should be brought to the notice of the manufacturers, and that, on the basis of information received, recommendation might then be made as to the nonacceptance of superfluous dosage forms.

Large Doses of Vitamin D₂ Preparations in Hypoparathyroidism.—The Council considered the question of accepting preparations representing large doses of vitamin D₂ for treatment of hypoparathyroidism and requested that the evidence be further studied with a view to the preparation of a report.

Nomenclature of Salts of Basic Substances.—With especial reference to the salts of Adrenalin, Suprarenalin, Suprarenin and Novocain, the Council considered the lack of terminologic conformity with the Council's ruling that the name of a product should indicate clearly whether it is marketed as the base or as the salt of the base. For some years the Council has been attempting to persuade manufacturers to conform to this modern principle, with success in the case of some manufacturers and lack of success with others, apparently because of the fear engendered by the somewhat confused status as to what constitute copyrights and trademarks. The Council reaffirmed its ruling and voted to continue its effort toward conformity with the principle represented.

The Scope of New and Nonofficial Remedies.—The value of the section "List of Articles and Brands Accepted by the Council But Not Described" was questioned and the Council decided that a study should be initiated with a view to recommendations of such changes as may be necessary or desirable. The suggestion was made that the drugs in this section should be treated on the same basis as any other drug, whether official or not, and described in the body of the book. After a general discussion of the scope of the book the Council voted that the Chairman appoint a special committee to review the Council's rules and policies and present a report for consideration before the next Council meeting.

Clarification of the Application of the Food, Drug and Cosmetic Act to Labeling Consideration.—The Council voted to adopt the government definition of "label" and "labeling," which is given as follows:

The term "label" means a display of written, printed or graphic matter upon the immediate container of any article.

The term "labeling" means all labels and other written, printed or graphic matter upon any article or any of the containers or wrappers accompanying such article.

Caution Statement for Thiamine Hydrochloride Preparations.—The Council voted to adopt the following revision of the caution statement for thiamine hydrochloride preparations representing a dosage of 3 mg. or more:

CAUTION: FOR THERAPEUTIC USE ONLY. TO BE USED ONLY BY OR ON THE PRESCRIPTION OF A PHYSICIAN.

Solution of Zinc Insulin Crystals and Protamine Zinc Insulin Prepared from Zinc Insulin Crystals.—The Council voted to adopt the name of the U. S. P. Revision Committee for Zinc Insulin Crystals and Solution of Zinc Insulin Crystals.

Pressor (Renin) and Antipressor Kidney Extracts.—The Council voted to initiate action toward preparation and publication of a report on the pathogenesis and treatment of hypertension in the light of present day knowledge. This will call for further investigation, and action will be initiated toward this purpose.

Preservatives.—The Council voted that its interpretation of the term "Preservative" should be redefined to include antioxidants, stabilizers, bacteriostatics and all other substances used for the purpose of maintaining the identity, strength, quality or purity of the preparations.

Progesterone.—The Council voted that a brief report should be prepared on Progesterone, to the effect that the therapeutic indications are not sufficiently well established to justify acceptance of the substance of any brand at this time. The fields of clinical investigation involved will be outlined in the report.

The Hydrates of Sulfathiazole Sodium.—Three different forms of sodium sulfathiazole have been presented for the Council's consideration: the anhydrous, the monohydrated and the sesquihydrated forms. The Council decided that the interested firms should be informed that it appears desirable for the Council to accept only one form of sulfathiazole sodium, unless convincing evidence to the contrary is shown.

"Tocopherol."—The question of nomenclature was discussed. The report which is to be prepared for publication will point out the Council's objection to the name and will indicate that current clinical evidence does not warrant the acceptance of preparations of this substance.

The Value of Gas Bacillus Antitoxin.—The Council voted that for the present Gas Bacillus Antitoxins should be retained in N. N. R. However, the Council will sponsor a statement to the effect that experimental evidence brought to the Council's attention raises a question as to the actual value of such antitoxins as far as the *Clostridium septicum* (*Vibrio septique*) component is concerned. This will call for further investigation, and action will be initiated toward this purpose. The Council voted to suggest to the manufacturers of gas bacillus antitoxins the desirability of marketing a preparation containing only the *Clostridium perfringens* (*C. welchi*) antitoxin.

Proposed Conference With Representatives of the American Pharmaceutical Association.—The Council voted to postpone action pending further information and arrangements.

The Problem of Rule 11.—The Council voted to omit the "Explanatory Comments to Rule 11" from page 33 of the pamphlet containing the Council's rules as well as from the comments published in New and Nonofficial Remedies. The Council voted that a general statement that the Secretary of the Council will be glad to answer questions with regard to rules and their application be added to the explanatory comments to the rules.

The Status of the Winthrop Chemical Company Under Rule 11.—The Council discussed the problem and reached the conclusion that the current activities and policies of the firm do not conflict with Rule 11.

Contraceptives.—The Council voted to consider contraceptive drugs for acceptance on the same basis as other drugs. The Chairman of the Council on Pharmacy and Chemistry was authorized to appoint a Committee on Contraceptives to consider drugs in this field and make appropriate reports on contraceptive preparations, statements for publication and other matters relating to contraceptives. It was decided that the Council should appoint an Advisory Committee on Contraceptives to consist of outstanding men in the field and that a statement of current Council policy concerning contraceptives should be prepared for publication.

Brochure Problem.—The Council reaffirmed its policy with regard to consideration of advertising brochures. This policy might be stated as follows:

The Council will continue to examine labeling and reasonably brief advertising brochures in the light of permissible claims. The Council does not possess the facilities for adequate and detailed examination of onerously voluminous brochure material. In such cases the responsibility for any claims made must be accepted by the firm, which, by reason of the acceptance of its product, is bound to limit its claims to those sanctioned by the Council.

Statement of Animal Sources.—The Council recently adopted the principle that the source of animal products must be stated on the label in case there is a reasonable possibility that their use may precipitate allergic reaction. This was defined as applying to noncrystalline products for parenteral use and to vegetable oil vehicles of parenterally injected preparations. The Council discussed this problem with manufacturers' representatives and voted that the ruling concerning exact designation of animal sources of products be not applied to accepted brands of insulin. However, it was decided that the N. N. R. descriptions of accepted products should state explicitly the animal source. The Council authorized the obtaining of information as to the incidence of allergic reactions from the injection of the various types of insulin and as to how far those appear to be related to the particular animal source or sources of the insulin. Official publication of the Council's general ruling will be made, and manufacturers will be given a reasonable time in which to comply.

Stilbestrol vs. Diethylstilbestrol.—The Council voted to authorize publication of a report designating the term "Stilbestrol" as the common, nonproprietary designation for 4:4'-dihydroxystilbene, and the name "Diethylstilbestrol" as the common nonproprietary designation for the diethyl derivative, 4:4'-dihydroxy alpha:beta-diethylstilbene. This report was subsequently published (*THE JOURNAL*, Nov. 8, 1941, p. 1625). In addition the Council decided that for the period of one year (dating from this publication) no objection will be made to the labeling statement "Diethylstilbestrol, also known as Stilbestrol."

Council on Foods and Nutrition and the

Council on Industrial Health

BECAUSE OF THE MANY REQUESTS WHICH HAVE BEEN ADDRESSED TO THE COUNCIL OFFICES REGARDING THE ADVISABILITY OF ADMINISTERING VITAMIN PREPARATIONS TO WORKERS IN INDUSTRY, AND BECAUSE OF THE PRESSURE WHICH HAS BEEN APPLIED TO EMPLOYERS BY GROUPS INTERESTED IN THE SALE OF VITAMIN PREPARATIONS, THE COUNCIL ON FOODS AND NUTRITION AND THE COUNCIL ON INDUSTRIAL HEALTH APPOINTED A COOPERATIVE COMMITTEE CONSISTING OF MEMBERS OF BOTH COUNCILS TO REVIEW EXISTING EVIDENCE CONCERNING THE VALUE OF THE ADMINISTRATION OF VITAMINS TO WORKERS IN INDUSTRY AND TO PREPARE A REPORT ON THIS SUBJECT. THIS COMMITTEE CONSISTED OF DRS. LEROY U. GARDNER, LEVERETT D. BRISTOL, AND CLARENCE D. SELBY OF THE COUNCIL ON INDUSTRIAL HEALTH AND DRS. GEORGE R. COWGILL, JAMES S. MCLESTER, AND RUSSELL M. WILDER OF THE COUNCIL ON FOODS AND NUTRITION.

THE FOLLOWING REPORT HAS BEEN PREPARED BY THIS COMMITTEE AND HAS BEEN AUTHORIZED FOR PUBLICATION AFTER CONSIDERATION BY BOTH COUNCILS.

FRANKLIN C. BING, Secretary,
COUNCIL ON FOODS AND NUTRITION.
CARL M. PETERSON, M.D., Secretary,
COUNCIL ON INDUSTRIAL HEALTH.

INDISCRIMINATE ADMINISTRATION OF VITAMINS TO WORKERS IN INDUSTRY

While recognizing the great significance of vitamins to human nutrition and the importance of preparations of vitamins when properly used, the Council on Foods and Nutrition and the Council on Industrial Health of the American Medical Association disapprove of the mass, indiscriminate administration of vitamins to industrial employees for the following reasons: It is irrational from the therapeutic point of view and therefore has no place in a program aimed at securing industrial health. It is unwise nutritionally because special vitamin preparations cannot take the place of valuable natural foods in achieving the completely satisfactory nutritive state. Finally, because a good diet can provide all that vitamin preparations have to offer and more.

Read before the Fourth Annual Congress on Industrial Health, Chicago, Jan. 13, 1942.

in this connection, the practice of mass administration of vitamins is uneconomical. An extended discussion of the evidence and reasons leading to these conclusions is presented herewith.

The application of discoveries in preventive medicine and public health to the situations prevailing in industry has in considerable measure kept pace with the developments in these sciences. Some discoveries have had prompt general application; concerning others there has been a considerable lag. It is generally recognized that the employer should provide hygienic surroundings, proper sanitary facilities, and machine guards and the like to decrease accidents. The importance of reducing wherever possible the degree of exposure to poisonous fumes, special chemicals that are harmful in any respect, and other substances to be encountered in industry is widely appreciated. The discovery that the muscle cramps occurring in men working in a hot humid environment with its consequent profuse sweating are due to the loss of electrolytes from the body by way of the sweat has led to the practice of providing sodium chloride to the workers in the industries involved. Some managements have even yielded to sales propaganda and administered cold vaccines to industrial employees in an attempt to reduce absenteeism, particularly in the winter months. It is not surprising, therefore, that there should now be much interest in the question whether vitamins should be administered to industrial workers.

DIETARY DEFICIENCIES

Recent discoveries in the science of nutrition, especially with respect to these dietary essentials, have attracted wide attention. There has been a growing appreciation of the existence of what some have called a "subnutritive" state, by which is meant a moderate degree of dietary deficiency of some sort. Various estimates have been made of the extent to which this exists in the general population. These estimates have been based on dietary studies, and as a rule the diets of the working members of the families are not dealt with individually. Nevertheless it is often assumed that the same incidence prevails among the industrial workers as in the general population. During the condition of national emergency which for a long time has involved activities carried on under a slogan of preparedness, the need for optimal nutrition of the industrial worker has been emphasized and the idea stressed in many quarters that this necessarily means giving vitamins to the employees. The change of our national situation from one of preparedness to all out war effort will doubtless lead to further emphasis on this idea in many quarters. It is pertinent, therefore, to give this proposal a critical examination. Students of nutrition at once recognize in this idea not merely the question whether any vitamins as such should be given but another question as well, namely that concerning the source of the vitamins to be given if indeed they should be provided, whether this is in the form of pills, capsules and the like or recognized valuable natural foods.

PROPER NUTRITION

The National Nutrition Conference for Defense held in Washington, D. C., during May 1941, in its consideration of nutritional problems facing the nation, gave attention to the question of proper nutrition of the industrial worker. The recommendations of the conference on this subject might be summarized in the statement that so little is known about workers' diets

and so scanty is the evidence concerning the amount and kind of nutritional deficiencies prevailing among them that the primary task is to obtain such information by the use of rigidly controlled studies. The conference also recommended supplemental feeding in factories wherever it was found that workers' diets fell below the modern standard of adequacy. No suggestion was made that the pure vitamins or concentrates of them should be used; the whole emphasis was on the use of natural foods to bring up inadequate diets to the required level.

The Committee on Nutrition in Industry of the Food and Nutrition Board of the National Research Council has given this general question more detailed consideration. Because of the paucity of information available, this committee decided to make such a survey as was possible during the three summer months of 1941. This survey revealed that there was much room for improvement in the feeding of the men in plants that undertake to provide food of any kind. It was found that little attention has been paid to the kinds of foods served in the cafeterias from the point of view of modern nutrition. A qualified nutritionist who classified seven hundred lunch trays passing through the cafeteria line of a New England plant considered three hundred and ninety of them inadequate and three hundred and ten of them good. Similar conditions were found in other plants. Yet in some of these very plants where feeding facilities had already been established, consideration was being given the idea of indiscriminate administration of vitamins to all employees with no examination of the question whether the existing plant facilities for feeding employees were doing what might be expected of them; whether the foods made available through these facilities were as well selected as they might be in the light of modern nutritional knowledge. In one establishment the management had arranged for lunches to be provided by a concessionaire but apparently had given no attention to the nutritive value of the food so provided. Other instances might be cited supporting the point that much can still be done to improve the nutrition of the industrial worker through careful examination of present facilities to see that they are most effectively used; and if this is done the need for any administration of vitamins as such should be comparatively rare and the result of very special circumstances instead of the rule as advocates of this plan would have us believe.

EXPLOITATION OF VITAMINS

The possibilities of sale of vitamins resident in action of this sort by industrial concerns are being exploited in many quarters. Several companies have been formed for the express purpose of promoting this to industry. It is obvious that such a program should have a firm basis in scientific fact before being widely adopted by industry. Commercial possibilities do not constitute a sufficient basis for advocacy of such a program by the medical profession or scientists generally. Some of the literature prepared by firms exploiting these possibilities is attractive and undoubtedly has a great appeal to the busy industrial executive who must deal with it. All the arts of salesmanship seem to have been drawn on in the preparation of it, and the general impression created is that the proposals of the salesman have a firm scientific basis, an impression which does not stand careful analysis by competent students of nutrition.

One of the claims advanced centers around the idea of insuring industrial production through what is called

"vitamin health control" illustrated by the statement "it is wiser to fortify the rations of employees with required vitamins than allow them to work undernourished." Physicians are of course aware that many factors are required to prevent undernourishment, that vitamins are only a few of those needed.¹ A detailed list of these many factors totals approximately forty, and of course all of them are readily secured from a good diet of natural foods. Calories are particularly important, and the number of calories required by workers varies directly with the amount of muscular effort expended. No amounts of vitamins and essential mineral nutrients can obviate this need for energy. Furthermore, if wholesome natural foods are used as the source of the needed calories the required vitamins and minerals will be secured automatically because they are contained in these natural foods.

A considerable part of the supposedly scientific support advanced for this promotional effort consists almost invariably of compendiums of quotations from various sources, addresses of leaders in nutrition, extracts from their published papers and the like, all such material being reprinted without any regard for the original context in relation to which the statement had a definite and appropriate meaning appreciated by the reader. In its new environment the quotation is given an implication never intended by its author, and this implication is emphasized with all the force that the art of salesmanship can muster. The next "proof" with which the business executive is confronted in this sales effort is of the testimonial type. Certain concerns are mentioned as having tried out the practice of supplying vitamins to their employees with alleged successful results. Concerning this the thoughtful student of the problem is led to ask Where are the data yielded by such tests? So far as the Council on Foods and Nutrition is aware they have not been published, nor have they been summarized in memorandums of any kind and made available for disinterested study by competent persons. It is pertinent to point out here that the proper planning and execution of such tests are matters requiring the services of qualified scientists who are familiar with the need for making suitable control observations before conclusions are drawn. The subject is so important nutritionally, medically and economically that the conclusions should not be based merely on general impressions of business executives and other members of the scientific laity. The Council on Foods and Nutrition has always had as one of its guiding principles, to be applied when passing on claims advanced for foods, that there be suitable scientific evidence in support of the claims made. Too often it has turned out that such evidence is not at hand, but rather a body of information of the vague sort illustrated by the statement "we get good reports from doctors and others." Essentially this same situation appears to prevail with respect to this question of the value of an indiscriminate administration of vitamins to industrial workers by their employers. At the present time there is no body of scientific information on which to base the recommendation that industry as a whole adopt this practice.

ADEQUACY OF DIETARIES

Much of the evidence cited in support of this policy concerns the question of the adequacy of the various dietaries characteristic of the people of the United

1. Booher, Lela E.: Adequate Nutrition for the Industrial Worker, J. A. M. A 114: 548 (Feb. 17) 1940.

States. Students of this problem recognize that the dietaries representative of certain sections of the country are probably quite inadequate in contrast to those in use elsewhere. It was appreciation of this fact that led the Committee on Nutrition in Industry of the National Research Council to conclude that any careful scientific investigation of this question should involve tests made, if possible, in at least four sections of the country. Those who are promoting the idea that commercial concerns provide vitamins to their employees have as yet given no indication that they appreciate this fact about degrees of adequacies of diets in different sections of the nation. The closest approach to this that can be cited is seen in the offer of one firm exploiting this program which reads as follows: "A choice of proven formulas is available, or special combinations to meet unusual situations may be worked out." Even when the general character of the diets used in a given section is known, one cannot be sure that this represents the diet which the worker receives; McHenry and his associates² in their study of the diets of families in Toronto, Canada, observed that the worker was likely to get a better diet than any other member of the family.

It appears obvious that, broadly speaking, the dietaries of the industrial workers in a given section of the country will reflect in part the general situation prevailing in the population of that area and in part the food habits characteristic of the racial and other background of the individuals in question. Consideration of this must lead to the conclusions (a) that on the basis of present knowledge broad generalizations concerning inadequacies of the diets of industrial workers are quite unjustified and (b) that the decision to give vitamins to industrial workers should depend on the results of careful study of each particular situation with respect to the dietaries of the employees in question and all other pertinent circumstances.

Concerns that are interested enough in this problem to consider spending large sums of money just to buy vitamin pills for their employees could render a valuable service to their industry and section of the country if they would use this money to support research on this question in their plants. Such studies should include the collection of carefully controlled observations and publication of the findings under proper scientific auspices so as to permit independent appraisal of the results. The appropriate limitations to the generalizations arrived at would be evident in the published report. In making such studies these concerns would soon learn that our present technics for revealing the presence of moderate vitamin deficiencies in their employees are in need of development. This subject constitutes one of the important fields of research now being cultivated. A program of indiscriminate administration of vitamins to employees means, of course, giving the vitamins to people who are apparently normal. Therefore any deficiency that is being so treated (?) is of the moderate or subclinical type; proof of the existence of such a deficiency is difficult.

Numerous suggestions can be offered of constructive action that business executives might take now in relation to this question pending the completion of the researches just mentioned. Industrial plants might assist more than they do in the educational work that must be done. They might be used for the display

of posters and the distribution of literature that teach how to select a good diet. Organizations of employees could well be enlisted in a campaign to educate the individual workers in such matters and through them their wives who select the food served in their homes; through them the wives could be encouraged to attend the various nutrition classes that are being established in the communities throughout the land as part of the national drive on nutrition in relation to defense. The use in the plant of slot machines that dispense bottles of milk could be studied to determine its value for the plant in question. Nutrition committees have been established in the various states and many of their political subdivisions, and their work integrated with that of the State Defense Council. Through these committees the management of any plant may readily secure advice and assistance in improving the general nutrition of the workers. Many organizations representative of various parts of the food industry, the National Dairy Council to mention but one example, have a valuable contribution to make through their posters and other material prepared for use in the broad educational work concerning nutrition. Through the various nutrition committees this material, as well as that emanating from federal agencies such as the Bureau of Home Economics, Children's Bureau, National Institute of Health, National Red Cross and numerous state agencies that might be cited can be secured. There is now an Assistant Director of Defense, Health and Welfare, whose duties include the dissemination of information on nutrition. This office is located in the Federal Security Agency, Washington, D. C., and is at present under the direction of Mr. M. L. Wilson. Information about all of the government agencies disseminating information relating to nutrition may be secured from this office. Industry might well make use of these resources.

SPECIAL NEEDS IN PARTICULAR INDUSTRIES

It will doubtless be argued in certain quarters that in particular industries the workers may have a greater requirement for one or more vitamins because of the conditions of the employment. Certain distributors of vitamin preparations have been advocating the administration of vitamin C as a prophylactic measure against poisoning by metals, organic solvents, aniline derivatives, phenol, cyanides and so on. The scientific evidence offered at this time in support of such a practice is unsatisfactory. In view of this, such a practice must be regarded as purely experimental and not allowed to create in the mind of the employer as well as employee a false sense of security, thus contributing to the lax application of other obviously proper safety measures.

CONTROLLED STUDIES

There have been a number of investigations in this field where an attempt was made to conduct the experiments with proper controls. Holmes, Pigott, Sawyer and Comstock³ thus studied the possible value of the administration of cod liver oil for reducing industrial absenteeism due to colds and related respiratory diseases. Wise and Schettler⁴ investigated the efficiency in color matching by employees who had rated as below the optimum in vitamin A by biophotometer tests and were then given carotene. Schettler, Bisbee and Good-

2. Patterson, J. M., and McHenry, E. W.: A Dietary Investigation in Toronto Families Having Annual Incomes Between \$1,500 and \$2,400, *Canad. Pub. Health J.* 32: 251 (May) 1941.

3. Holmes, A. D.; Pigott, Madeline G.; Sawyer, W. A., and Comstock, Laura: Cod Liver Oil: A Five Year Study of Its Value for Reducing Industrial Absenteeism Caused by Colds and Respiratory Diseases, *Industrial Med.* 5: 359 (July) 1936.

4. Wise, R. C., and Schettler, O. H.: Report on the Use of the Biophotometer and Vitamin A Therapy in Industry, *Ohio State M. J.* 34: 666 (June) 1938.

enough⁵ have studied the effect of the administration of vitamin A on retinal fatigue. While the evidence regarding the value of the administration of vitamin A in the reports cited is considered too meager to justify claims for the vitamins, these studies stand out as examples of the kind of work that needs to be done in order to ascertain the facts.

In considering these particular studies it should be remembered that an examination of some sort was first made of these employees and then the effect of administration of a vitamin was tested. With data of this sort available, administration of large amounts of the appropriate vitamin for a given period is quite proper in order to bring the employee to the optimal state, after which the use of a good diet is all that is necessary. As another example it might be contended that difficult muscular effort with consequent greater combustion of carbohydrate should lead to a greater requirement for thiamine (vitamin B₁). Here again, however, one is dealing with a matter that is amenable to scientific test and which, therefore, should be subjected to such tests before being considered as settled. Such evidence as has been secured in relation to this particular question of muscular fatigue, however, does not support the idea that vitamin administration is of value to young, healthy men subsisting on an adequate diet. For example, Keys and Henschel⁶ at the University of Minnesota have carefully tested the value of supplementing a good U. S. Army ration with liberal amounts of available vitamins. The tests involved measurements of muscular performance on a treadmill carrying a heavy pack, time required for recovery from fatigue, study of heart action and related physiologic processes. Tests were made during periods when the men were subsisting on the army ration alone and again when receiving the diet together with an additional supply of vitamins. Furthermore, the foods actually eaten were recorded and the adequacy of the ration itself was determined. It was concluded that supplementation of an adequate diet with additional amounts of vitamins serves no useful purpose. Students of nutrition would doubtless anticipate such a result.

DIET AND FATIGUE

This question of the relation of dietary factors to fatigue and industrial efficiency has other important aspects that are in no way covered by indiscriminate administration of vitamins to all employees. On the basis of their controlled observations of muscular efficiency measured by the performance of manual tasks, Haggard and Greenberg⁷ believe that industrial efficiency accompanied by a subjective feeling of well-being and vigor is affected by the so-called hunger contractions of the empty stomach and the concentration of circulating blood sugar; and these factors are related in an important way to the frequency of meals. More recently these authors⁸ have reemphasized the importance of between-meal feedings in industry and pointed out the necessity for providing "both minerals and vitamins in addition to at least 30 Gm. of carbohydrate." The blanket administration of vitamins to employees does not solve this problem, whereas the opposite is

true when an extra supply of wholesome food is given. Extra meals consist of appropriate natural foods, and vitamins needed for the metabolism of this extra food energy will be provided automatically in those foods. The so-called Oslo breakfast,⁹ which has been used so successfully in Norway and again in England,¹⁰ is just this type of meal, being made up of various protective foods rich not only in vitamins but in other important nutrients as well.

INDIVIDUAL NEEDS

At least one concern has followed the practice of providing vitamins to employees (or assisting in this) when the employee's private physician expresses the opinion that this person may be in need of vitamins. In such a situation, obviously, the employee has gone to the trouble to consult his doctor for some reason, and vitamins have come into the picture as a result of that consultation. This situation is, of course, quite different from that of blanket indiscriminate distribution of vitamins by the concern to all its employees, the question under discussion.

EXPERIENCE IN FOREIGN COUNTRIES

The importance of the use of natural foods rather than vitamin pills in solving any dietary inadequacies of industrial workers is both illustrated and emphasized by the experience of Norway and England. Mention has already been made of the Oslo breakfast. Mr. Bevin, minister of labor in Great Britain, has ruled that all factories employing two hundred or more men must set up canteens to provide the workers with one good meal each day. The minister of health and other authorities in Great Britain have viewed with disfavor every attempt to dispense vitamins to workers. The significance of this attitude will be more readily appreciated when it is remembered that food is rationed in the British Isles and protective foods are scarce. If, under these conditions, it is preferable to supply the workers with good natural foods rather than with vitamins, there seems to be no basis for indiscriminate administration of vitamins to workers in this country.

CONCLUSION

In view of the foregoing discussion, the Council on Foods and Nutrition and the Council on Industrial Health conclude that satisfactory evidence of the wisdom of the general practice of industrial concerns providing all of their employees with vitamins indiscriminately is lacking; the Councils cannot give their support to the program of which this is the objective. When a satisfactory study of any given industrial situation indicates the wisdom of providing vitamins to employees, the Councils wish to point out the necessity for observing the proper scientific limitations of such action to the situation in question; after the employee has been restored to a good nutritive state, the use of a good diet of natural protective foods thereafter should then suffice. Nothing in this report is intended to belittle the significance of vitamins in nutrition, or the value of the proper use of added vitamins in improving staple foods such as bread and flour. What is being emphasized is the need for the avoidance of indiscriminate mass use of vitamins, a practice which supports the commercial exploitation rather than scientific rational use of these important dietary factors.

5. Schettler, O. H.; Bisbee, R. F., and Goodenough, B. H.: Report of the Use of Biophotometer and Vitamin A Therapy in Industry, *J. Indust Hyg & Toxicol* 21: 53 (Feb.) 1939.

6. Keys, Ancel, and Henschel, Austin F.: Vitamin Supplementation of U. S. Army Rations in Relation to Fatigue and the Ability to do Muscular Work, *J. Nutrition*, to appear in March 1942.

7. Haggard, H. W., and Greenberg, L. A.: Diet and Physical Efficiency, New Haven, Conn., Yale University Press, 1935.

8. Haggard, H. W., and Greenberg, L. A.: The Selection of Foods for Between-Meal Feedings in Industry, *J. Am Diet. A* 17: 753 (Oct) 1941.

9. Schlotz, C.: On the Feeding of School Children in Oslo, 1927, cited by Burnet, E., and Aikroyd, W. R.: Nutrition and Public Health, *League of Nations Quarterly Bulletin of the Health Organization* 4: 408 (June) 1935.

10. Wright, M. D.: The Oslo Meal—Its Acceptability Among Industrial Workers, *J. Roy Inst Pub Health Hyg* 3: 253 (Oct) 1940.

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SATURDAY, FEBRUARY 21, 1942

INDUSTRIAL MEDICAL MOBILIZATION

Wartime industrial medical personnel are needed in three principal fields: (1) the government services, (2) governmentally owned but privately operated ordnance works and (3) private plants with war contracts. Requirements for medical personnel in the government plants center mainly in the U. S. Public Health Service, in state and local bureaus of industrial hygiene and in the arsenals and shipyards operated by the Army and Navy. These agencies have already expanded ordinary facilities through selection and training of eligible candidates. Among other agencies responsible for production of war material the demand for medical service, although acute in some localities, is developing much more slowly. This is not to be construed as lack of interest in the physical welfare of workers on the production lines. Under the pressure of events neither employers nor physicians yet fully comprehend how vast a contribution could be made to the war effort by a well organized industrial health program. A reduction of 10 per cent in the four hundred million man days now lost annually from illness and injury in industry represents the time required to build five capital ships, sixteen thousand tanks or nine thousand bombers.

Medical organizations, in company with trade and manufacturing associations, are beginning to undertake the dual obligation of educating industry to the benefits of modern industrial health and developing physicians able to respond to this created demand for medical supervision. The process must be accelerated lest some form of compulsory medical supervision be imposed on industry, as has already occurred in England. The ability to bring the physician into the plant under terms agreeable to industry, to the worker and to medicine will be enhanced if suitable education and promotion can be developed.

If a substantial demand is created, much will depend on the ability of the Procurement and Assignment Ser-

vice to avoid the dislocation of the existing supply of competent industrial physicians who are doing an essential job of keeping indispensable men at work. A physician under 45 who is physically fit and who wishes to remain in his industrial position would need to be certified as absolutely essential to industry by the industrial establishment which employs him. Industrial physicians in the 45 to 60 age groups might be dislocated if certain specialist classifications should be called. In the over 60 group, dislocation is considered unlikely. New medical personnel for industry will be located and assigned under advice from corps area, state and county referees, with the assistance of the Procurement Board's Advisory Committee on Industrial Health and Medicine. As substitutes for eligible and replaceable industrial physicians, principal reliance will no doubt be placed on physically unfit male physicians under 45, male physicians over 45, women physicians and qualified laboratory or technical personnel whose employment in appropriate work would release an otherwise essential physician.

The Council on Industrial Health of the American Medical Association can implement these plans by acting as a center to which industry may apply for medical personnel. Steps are now being taken to acquaint the principal trade associations, government agencies and business publications of this arrangement. The medical requirements of private industry ought to be met locally whenever possible, especially if only part time service is required. If such an arrangement is not possible, conservation of medical talent would suggest joint coverage of a number of small plants by the same industrial physician.

POSTGRADUATE EDUCATION IN INDUSTRIAL HEALTH

A successful series of educational institutes on industrial health was sponsored recently by the Committee on Industrial Health and the speakers' bureau of the Iowa State Medical Society in cooperation with the Iowa State Department of Health. Each institute was sponsored locally by the county medical society, the president or secretary acting as chairman of local arrangements. The purpose of these institutes was to stimulate and correlate the interest in industrial medicine of the general practitioner, the industrial physician and the manager of industry.

The plan and purpose of the institutes were approved by the U. S. Public Health Service, and the necessary budget was granted from funds provided by title VI, Social Security Act. A per diem of \$50 was allowed speakers outside the state and \$25 for those living in Iowa, with travel expense additional. The total budget expenditure for speakers, printing, postage and inci-

dentials averaged \$250 for each institute, including the expense of collecting all lectures or abstracts in booklet form for distribution. Publicity was built up carefully and systematically. Thirty days preceding each institute the city chosen was visited by the industrial engineer and the medical director of industrial hygiene in the state health department for a conference with the officers of the county medical society and leading industry. The editor of the local newspaper was visited to enlist his interest. Two weeks preceding the institute, letters outlining the program were sent to all licensed physicians and leading industrialists in the eight or ten counties contiguous to the city in which the meeting was to be held. If held in one of the border towns, special letters were sent to physicians residing in the adjacent states. Shortly thereafter a complete program was sent, accompanied by instructions regarding special features and enclosing a return addressed postal card on which the recipient indicated his intent to attend. Three days before the scheduled date a reminder post card was sent out. All publicity material was prepared by the division of health education in the state department of health and mailed from the speakers' bureau of the state medical society. Appropriate press notices were released at proper times.

A typical industrial medicine institute included a lecture introducing the subject of industrial hygiene with particular reference to its employment by practicing physicians, a demonstration of apparatus and methods used in making an industrial hygiene survey, a comprehensive discussion of occupational diseases keyed to the existing status in Iowa, a delineation of plans for the control of syphilis in industry, a lecture on the surgical management of industrial injuries, and usually a paper on back injuries. Specific instruction was also supplied about the general field of medical relationships in industry and the part which the practicing physician could play as logical adviser to industrial management in the organization of a medical department on either a full time or a part time basis. The medicolegal phases of industrial health were illustrated mainly through reference to the silicosis and industrial dermatitis problems. Each institute was also addressed by a leading industrialist in the community as an expression of managements' interest in the maintenance and improvement of the health, comfort, security and efficiency of employees. The closing exercise of each institute consisted of a panel or round table discussion.

About twelve hundred physicians attended these nine institutes. This type of postgraduate education in industrial health is a proper function of state medical society committees on industrial health in cooperation with state departments of health. The need is evident and the effort, as shown by the experience in Iowa, is distinctly worth while.

VITAMINS AND INDUSTRIAL WORKERS

Vitamins for defense and vitamins for victory are popular themes of the day. Factories and offices seem to be bearing the brunt of the campaign. Company officials have been bombarded with pamphlets and advertising matter describing the need for improving the diet and offering preparations of vitamins, and sometimes of minerals, to help overcome all possible deficiencies. Sometimes an offer is made to concoct special formulas to suit the special requirements of the industry. Attempts are made to create the impression that an employer ought to contribute to national defense and the all out victory effort by distributing vitamin pills to every employee. He is promised increased efficiency of the workmen, and a decrease in absenteeism. Moreover the employer, it is suggested, will have the glow that comes to one who has performed a beneficent act.

Doubtless many physicians, especially those engaged in industrial medicine, have been confronted with the problem of passing judgment on whether or not vitamin preparations ought to be administered to all employees of industrial establishments. This means, of course, persons in apparently good health. The joint opinion of the Council on Industrial Health and the Council on Foods and Nutrition is presented elsewhere in this issue.¹ The Councils believe that the indiscriminate administration of vitamins to industrial workers is irrational from the therapeutic point of view, unwise from the nutritional point of view and uneconomical.

The Councils have offered a number of positive suggestions for the consideration of those industries in which the employers, in good faith, have tried to improve the health of employees by jumping on the vitamin bandwagon. First, the Councils indicate that more research on the nutritional requirements of industrial workers be subsidized by the industry, provided it can be conducted by properly qualified investigators. The suggestion is also made that steps be undertaken to provide better lunchroom facilities and improved hygienic environment for all workers. These matters take time.

Today industrial plants may help to disseminate accurate educational material about foods and nutrition. This would provide information to the working men; moreover, the material could be taken home to the womenfolk, who are the persons most concerned in the buying and preparation of foods. Some progressive organizations already are developing or have developed suitable educational material for such purposes. The National Dairy Council and the American Meat Institute, among other organizations, have charts and pamphlets that have been approved by the Council on

1. Indiscriminate Administration of Vitamins to Workers in Industry, this issue, p. 618.

Foods and Nutrition. Governmental agencies also offer many leaflets. A single thoroughly developed guide is much needed.

The report of the Councils will be disappointing only to those who have hoped that a panacea might reside in small capsules easily swallowed between meals. Improvement in the nutritional status of a nation can come only by means of sound education under the guidance of medical scientists leading primarily to the promotion of food rather than the taking of pills and capsules.

MORALE

A bulletin just issued by the Association for the Advancement of Psychoanalysis calls attention to the increased discussion of the so-called war of nerves, or psychologic warfare. Modern warfare is discussed in terms of chemical warfare, psychologic warfare and even biologic warfare. Thus has civilization advanced! Perhaps it is a part of the German psychologic warfare to promote the belief that their propagandists have devised irresistible and psychologic weapons and stratagems with which the morale of opposing nations is led into helpless submission. The experts say that nothing could be further from the fact. The German psychologists know nothing beyond what American psychologists have contributed. Indeed there are many who are convinced that in psychologic science, as in other science, America leads the world. The bulletin of the Association for the Advancement of Psychoanalysis lists three basic principles which all of us should keep in mind:

1. Under war conditions an increase in anxiety and tension is natural and inevitable. Unless this is realized, an individual might consider himself cowardly and contemptible when he is actually sharing a common experience. If anxiety incapacitates an individual, then it is most probably not associated with the war and represents a personal problem for which psychiatric aid might be consulted.

2. Planned and directed efforts are valuable psychologic assets in controlling anxiety. Foolhardiness and impulsiveness are no cures for fear. They actually undermine individual and group morale.

3. Inactivity and isolation from the group beget anxiety. Useful, well directed, interrelated tasks in the interests of the community not only diminish individual tensions but are constructive and sustain general morale.

Obviously, morale is a matter of vital consequence to the nation. In July 1940 a Committee for National Morale was formed including representatives of all the various social sciences. In a recent issue of the *Journal of Educational Sociology* (December 1941) leading contributors discuss the importance of morale, the principle of morale building, the measurement of morale, the nature of the offensive from a psychologic point of view against the United States, and the danger points on the home front.

"A nation with good morale," as is pointed out by Dr. A. U. Pope, "is one with enthusiasm, confidence, teamwork and endurance." Many people like to think that morale is just common sense. However, the building of morale involves psychologic principles and studies of public opinion far beyond anything we have yet attempted in this country. The processes of morale building are closely allied to the processes of education. That morale is best built which is built from thousands of small centers in a nation rather than that based on the prestige and power of a few national figures. The chief danger points in the home front are obviously the bickering and the arguments which tend to split the nation into small groups, many organized specifically to question national decisions. Some of the incidents which have already occurred now that we are in the war indicate that the problem of the national morale is an exceedingly real one; we have not yet begun to deal with it effectively.

Current Comment

COORDINATION OF INDUSTRIAL HEALTH EFFORT

The first joint session between the Council on Industrial Health and the Subcommittee on Industrial Health and Medicine of the Federal Security Agency recommended that the Division of Industrial Hygiene of the National Institute of Health should develop, in cooperation with state health authorities and committees on industrial health in the state medical societies, a definite program of instruction on the fundamentals of industrial medicine, designed to carry into effect minimum standards set up to protect the health of employees. A plan recently inaugurated in Michigan has gained much favor as a practical expression of this recommendation. Whenever representatives of the Bureau of Industrial Hygiene in Michigan investigate working conditions in a plant, the employer is told that his plant physician will be welcome to accompany the inspectors. The Council on Industrial Health has inquired of other bureaus of industrial hygiene whether or not this arrangement would serve to improve coordination between the bureaus and the practicing medical profession. The response so far has been that such a plan, if regularly followed, would contribute more than any other single step toward improving the knowledge of the practicing profession about medical requirements in industry and the accepted methods for meeting these needs. Certainly committees on industrial health in the state and county medical societies should urge on their general membership the necessity for responding to invitations of this character. Physicians must assume responsibility in industrial health, especially in smaller plants. They must organize to meet the demands for wartime industrial production.

MEDICAL PREPAREDNESS

In this section of The Journal each week will appear official notices by the Committee on Medical Preparedness of the American Medical Association, announcements by the Surgeon Generals of the Army, Navy and Public Health Service, and other governmental agencies dealing with medical preparedness, and such other information and announcements as will be useful to the medical profession.

PROCUREMENT AND ASSIGNMENT SERVICE FOR PHYSICIANS, DENTISTS AND VETERINARIANS

OFFICE OF DEFENSE HEALTH AND WELFARE SERVICES

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MAJOR ROGER G. PRENTISS JR., M. C., U. S. Army

Address all communications to
Procurement and Assignment Service
601 Pennsylvania Ave.
Washington, D. C.

PREFACE

The Directing Board of the Procurement and Assignment Service, through the Committee on Information, has drawn up the following information regarding the organization and functions of the Procurement and Assignment Service. This pamphlet is designed to answer questions which may arise in the minds of individual physicians, dentists and veterinarians concerning the activities of the Procurement and Assignment Service.

In the appendixes are complete lists of the various cooperating committees and agencies that should be consulted with regard to matters of policy pertaining to their offices.

The corps area officers and the state chairmen in the respective professions will be available for consultation and advice.

For the Directing Board.

S. F. SEELEY, M.D., Major, M. C., U. S. Army,
Executive Officer,
Procurement and Assignment Service.

HISTORY

The Procurement and Assignment Service was authorized by the President on Oct. 30, 1941. The creation of this agency resulted from a recommendation from the Subcommittee on Education to the Health and Medical Committee of the Office of Defense, Health and Welfare Services on March 31, 1941. Following a meeting of the Health and Medical Committee on April 28, this recommendation was transmitted to the Committee on Medical Preparedness of the American Medical Association for its consideration. The latter

committee presented the recommendation to the House of Delegates of the American Medical Association, which resolved:

That the United States government be urged to plan and arrange immediately for the establishment of a central authority with representatives of the civilian medical profession to be known as the Procurement and Assignment Agency for physicians for the Army, Navy and Public Health Service and for the civilian and industrial needs of the nation.

On Oct. 22, 1941 the Health and Medical Committee named a commission to draft a plan for development of such a service. As a result of the meeting of this commission, it was recommended that an office for procurement and assignment of physicians, dentists and veterinarians should be established, that the office should be a part of the Office of Defense Health and Welfare Services and that the function of the office should be to procure personnel from existing qualified members of the professions concerned. The Procurement and Assignment Services, through the facilities of the Office of Defense, Health and Welfare Services, would have available the fiscal budgetary, legal and advisory departments of a well established governmental agency. The concluding paragraphs of its report are as follows:

For this reason a special commission, appointed by the Health and Medical Committee of the Office of Defense Health and Welfare Services has made the following recommendations:

1. That an Office of Procurement and Assignment of physicians, dentists and veterinarians be established.
2. That this office shall function as part of the Office of Defense, Health and Welfare Services, which is itself a part of the Office for Emergency Management.
3. The function of this office shall be to procure personnel from existing qualified members of the professions concerned. The office shall receive from various governmental and other agencies requests for medical, dental and veterinary personnel. These requests shall indicate the number of men desired, the time during which they must be secured, the qualifications and limitations placed on such personnel. The office must then by appropriate mechanism arrange to secure lists of professional personnel available to meet these requirements, utilizing such existing rosters, public and private, as it may find acceptable. It shall also be authorized to approach such professional personnel as is considered to be available and to use suitable means to stimulate voluntary enrolment.
4. The Office of Procurement and Assignment shall consist of a board of five members, one of whom shall be chairman. This board shall be chosen from members of the medical, dental or veterinary professions and shall not include any salaried employees of the federal government. This board shall function without salary but shall be entitled to actual and necessary

transportation, subsistence and other expenses incidental to the performance of its duties.

5. The board shall appoint an executive secretary who shall serve also as executive officer and who shall be without vote in its deliberations and decisions. He shall serve as a full time employee with salary (to be determined) and with such assistants as the board may determine necessary to carry out its functions.

6. The board shall be authorized to establish such advisory committees and subcommittees as may be necessary. These committees shall represent the various interests concerned, such as medical, dental and veterinary schools, hospitals, Negro physicians and women physicians. Members of such committees shall serve without salary but shall be entitled to actual and necessary transportation, subsistence and other expenses incidental to the performance of their duties.

7. The board shall also be authorized to request various agencies of the government using medical, dental or veterinary personnel to appoint liaison officers and representatives to advise the board in carrying out its functions.

8. In carrying out its functions the board shall cooperate with such agencies as are now established under the Selective Service as well as other federal agencies.

On October 30, 1941 the following letter to the President from the Director of Defense Health and Welfare Services was approved by the President and constitutes the authority under which the Procurement and Assignment Service operates:

October 30, 1941.

My Dear Mr. President:

The coordination of the various demands made on the medical, dental and veterinary personnel of the nation and the most efficient utilization of this personnel would seem to require the establishment of a special agency capable of recording the qualified personnel available, of assigning or encouraging enlistment of such personnel in the services where most needed and of giving every qualified physician, dentist and veterinarian an opportunity to enroll himself in some service demanded by the national need.

For these reasons I wish to propose that there be established as one of the principal subdivisions of the Office of Defense Health and Welfare Services an office for the procurement and assignment of physicians, dentists and veterinarians. This office would be known as the Procurement and Assignment Agency.

The functions of the agency would be (1) to receive from various governmental and other agencies requests for medical, dental and veterinary personnel, (2) to secure and maintain lists of professional personnel available, showing detailed qualifications of such personnel, and (3) to utilize all suitable means to stimulate voluntary enrolment, having due regard for the overall public health needs of the nation, including those of governmental agencies and civilian institutions.

The agency would consist of a board of five members, one of whom would serve as chairman. The board would serve without salary but would be entitled to actual and necessary transportation, subsistence and other expenses incidental to the performance of its duties.

A full time executive officer (with salary to be determined) would be appointed, together with such assistants as would be required to carry out the functions of the Agency.

I recommend that the board be composed of Dr. Frank Lahey, chairman, Dr. James Paullin, Dr. Harvey B. Stone, Dr. Harold S. Diehl and Dr. C. Willard Camalier.

This communication is addressed to you in accordance with provisions contained in paragraph 4 of the Executive Order, dated Sept. 3, 1941, "Establishing the Office of Defense Health and Welfare Services in the Executive Office of the President and Defining Its Functions and Duties," to the effect that the President shall approve the establishment of the principal subdivisions of the Office of Defense Health and Welfare Services and the appointment of the heads thereof.

In the event you approve the establishment of the Procurement and Assignment Agency, together with the board mem-

bership as recommended, I shall proceed immediately with the creation of the agency and will prepare budget estimates in the amount of approximately \$50,000 for submission to the Budget Bureau to cover the costs of the agency.

In addition I would propose to instruct the Agency to draft legislation which may be necessary to submit to the Congress providing for the involuntary recruitment of medical, dental and veterinary personnel, in the event the exigencies of the national emergency appear to require it.

Sincerely yours,
Approved FRANKLIN D. ROOSEVELT.
PAUL V. McNUTT,
Director.

This letter was approved by the President, Oct. 30, 1941, and the Procurement and Assignment Service was organized accordingly.

LOCATION OF OFFICES

Central Office.—The accompanying chart shows the organization of the Procurement and Assignment Service. The executive officer is Sam F. Seeley, M.D., M. C., U. S. Army. The central office is located at 601 Pennsylvania Avenue N.W., Washington, D. C. To facilitate correspondence, all communications should be addressed to the central office.

Consultant Office.—A consultant office has been established in the headquarters of the American Medical Association, 535 North Dearborn Street, Chicago, under the supervision of Dr. R. G. Leland, where special information regarding physicians is maintained. Similar information regarding dentists is available at the headquarters of the American Dental Association, 212 East Superior Street, Chicago, and regarding veterinarians at the headquarters of the American Veterinary Medical Association, 600 South Michigan Avenue, Chicago. These facts include those supplied directly to the organizations concerned, the classifications developed by the special committees of the Division of Medical Sciences of the National Research Council and confidential information supplied by other agencies.

Corps Area Committees.—In each of the nine Army corps areas, a committee has been established. Each corps area committee includes a chairman, two physicians chosen from the general medical profession, a dentist chosen from the general dental profession, a representative of medical education, a representative of dental education, a representative chosen from the veterinary profession and a representative of the hospitals. These committees are advisory to the Procurement and Assignment Service in reference to questions relating to personnel and are part of the field organization of the Office of Defense Health and Welfare Services. The chairman of each of these committees acts in a liaison capacity to the corps area surgeons, and representatives of the Office of Civilian Defense, the Selective Service System in the corresponding corps areas. Liaison between the Procurement and Assignment Service and the Bureau of Medicine and Surgery, Navy Department, is maintained directly through the Executive Officer and a representative of the Bureau.

The following is a list of the nine corps area chairmen and the states in each corps area:

First Corps Area.—Chairman, Dr. W. G. Phippen, 31 Chestnut Street, Salem, Mass. States comprising corps area: Connecticut, Maine, New Hampshire, Rhode Island, Massachusetts, Vermont.

Second Corps Area.—Chairman, Dr. A. W. Booth, 222 West Church Street, Elmira, N. Y. States comprising corps area: Delaware, New Jersey, New York.

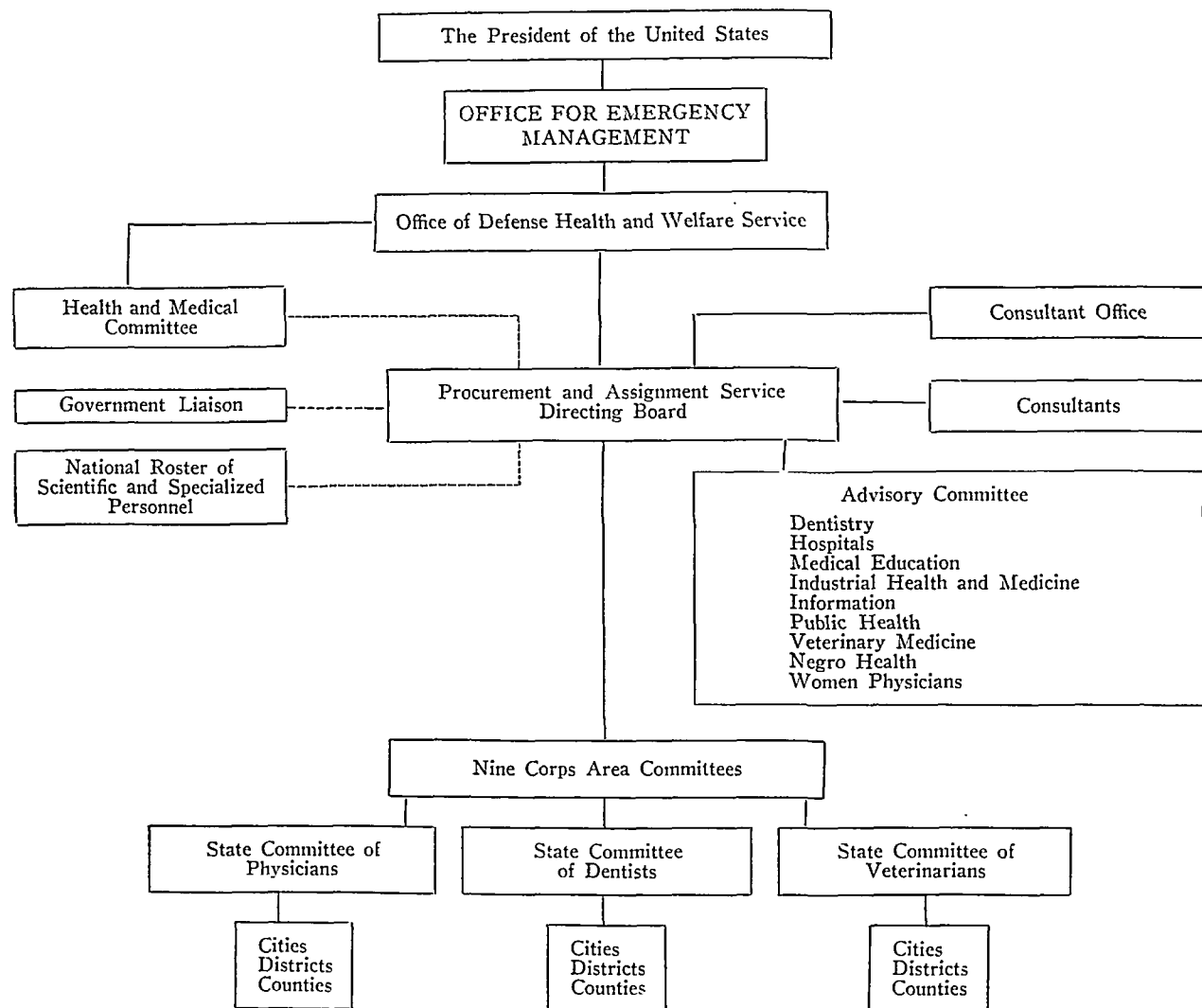
Third Corps Area.—Chairman, Dr. A. M. Shipley, University Hospital, Baltimore. States comprising corps area: Maryland, Pennsylvania, Virginia, District of Columbia.

Fourth Corps Area.—Chairman, Dr. Edgar Greene, 478 Peachtree Street N.E., Atlanta, Ga. States comprising corps area: Alabama, Florida, Georgia, Louisiana, Mississippi, Tennessee, South Carolina, North Carolina.

Fifth Corps Area.—Chairman, Dr. E. L. Henderson, 606 S. 4th Street, Louisville, Ky. States comprising corps area: Indiana, Kentucky, Ohio, West Virginia.

corps area committees and to the central office. To the state committees and also to the county, district and local committees will be referred especially questions concerning the essential character of such services as a physician, dentist or veterinarian may be rendering, thus determining his availability. They will also familiarize themselves with the functions of the Procurement and Assignment Service and thus be able to advise those in their community concerning its work.

ORGANIZATION OF THE PROCUREMENT AND ASSIGNMENT SERVICE



Sixth Corps Area.—Chairman, Dr. Charles Phifer, 30 North Michigan Avenue, Chicago. States comprising corps area: Illinois, Wisconsin, Michigan.

Seventh Corps Area.—Chairman, Dr. Roy W. Fouts, 107 S. 17th Street, Omaha. States comprising corps area: Arkansas, Iowa, Kansas, Minnesota, Missouri, Nebraska, South Dakota, North Dakota, Wyoming.

Eighth Corps Area.—Chairman, Dr. Sam E. Thompson, Kerrville, Texas. States comprising corps area: Arizona, New Mexico, Oklahoma, Texas, Colorado.

Ninth Corps Area.—Chairman, Dr. Charles A. Dukes, 426 17th Street, Oakland, Calif. States comprising corps area: California, Idaho, Montana, Nevada, Oregon, Utah, Washington.

State Chairmen and State Committees.—The state chairmen and the state committees are advisory to the

THE NATIONAL ROSTER

The National Roster of Scientific and Specialized Personnel was created by Executive action in July of 1940 as an office within the Executive Office of the President to be jointly supervised by the National Resources Planning Board and the United States Civil Service Commission. Two primary functions were assigned to the Roster: first, the formulation of as complete a list as possible of all of the United States scientifically and professionally trained citizens; and, second, the development of proper procedures for the most effective utilization of the skills of these citizens in connection with defense and other governmental and national needs. In pursuance of this directive, the Roster has

established a completely analytical punch-card list of the names, locations, and qualifications of the country's specially trained individuals in more than fifty strategic scientific and professional fields. Because of the fact that the American Medical Association was engaged in developing its own roster, the National Roster did not undertake to include any but a small specialized group of the general medical profession. It became necessary therefore to work out an agreement of cooperation between the National Roster and the Procurement and Assignment Service so that the latter could have the benefit of the Roster's experience and facilities in maintaining up to date lists of physicians, dentists and veterinarians. By special action of the boards of trustees of the American Medical Association, the American Dental Association and the American Veterinary Medical Association, all punch card files in the possession of these associations were made available to the National Roster.

By these joint efforts, the Procurement and Assignment Service will have available in the National Roster at Washington complete records of all material submitted by the professions. The professions in turn will have the benefit of material collected through the roster for their own punch card files at their national headquarters.

A consultant committee to the National Roster for medicine includes Drs. Morris Fishbein, R. G. Leland, and Olin West.

INFORMATION UTILIZED IN THE PROCUREMENT AND ASSIGNMENT SERVICE

Questionnaire.—American Medical Association: Beginning in June 1940, the American Medical Association circulated a questionnaire to the physicians of the country. The information from this questionnaire was tabulated in a punch card system which has been made available to the National Roster. Additional information concerning physicians was developed by the Division of Medical Sciences of the National Research Council and other cooperating agencies.

American Dental Association: The American Dental Association has circulated a questionnaire to all dentists. The information thus secured has been placed in a punch card system in the headquarters of the American Dental Association and also made available to the National Roster. The information in the headquarters of the American Dental Association is supplemented by information secured from cooperating agencies.

American Veterinary Medical Association: Through cooperation between the American Veterinary Medical Association and the National Roster, a punch card system covering the veterinary medical profession will be available in the National Roster and in the Headquarters of the American Veterinary Medical Association.

Following the declaration of war, Dec. 8, 1941, other questionnaires were immediately circulated with a view to securing lists of names of physicians who would offer their services for immediate utilization in the emergency. Since the supply of dentists and veterinarians was at this time adequate to meet the needs of the armed forces, additional enrolment forms were circulated only to physicians. As a result of this procedure the immediate needs of the armed forces were satisfied.

SPECIAL ENROLMENT FORM AND QUESTIONNAIRE FOR PROCUREMENT AND ASSIGNMENT SERVICE

The Procurement and Assignment Service, cooperating with the National Roster of Scientific and Specialized Personnel, has prepared special questionnaires for circulation to every physician, dentist and veterinarian in the United States. This questionnaire will come directly to all physicians, dentists and veterinarians as soon as possible after the National Registration on Feb. 16, 1942. *Every physician, dentist and veterinarian, regardless of age, sex, physical condition, citizenship or employment, should fill out and return the enrolment form and the questionnaire.* Those physicians, dentists and veterinarians who have been commissioned in any United States service previous to the receipt of the enrolment form and questionnaire should so indicate under the heading "remarks" on the enrolment form.

The original questionnaire and enrolment forms previously circulated by the American Medical Association, the American Dental Association and the American Veterinary Medical Association are being utilized to meet requisitions from the armed services and other agencies, until the National Roster is complete and the Procurement and Assignment Service is working routinely. The additional information secured by the special questionnaire now to be described will bring up to date the facts necessary to place each physician, dentist and veterinarian in the work for which he is best qualified.

Roster Questionnaire.—The questionnaire, as developed, includes space on which the physician, dentist or veterinarian will supply the usual data regarding name, address, date and place of birth, citizenship, marital status, race and sex, school of graduation, previous military service in the United States or in the armed forces of other countries, membership in the reserve corps or commissions in any branch of government service. Any additional information regarding special aptitudes, such as knowledge of aviation, radio or cryptanalysis, which might be of value, knowledge of foreign languages and foreign travel will also be included. Again, it should be emphasized, this information is sought to supplement information previously supplied on questionnaires. It is recognized that the status of any physician, dentist or veterinarian may have changed materially since the time when previous questionnaires were submitted. The new questionnaire will also be tabulated in a special punch card system which will be coordinated with the punch card systems previously mentioned.

In the new questionnaire, opportunity is also given to state in detail appointments held in various local, industrial, state or governmental agencies, in civil practice, and in education and research. Specialization is recognized by appropriate designations which coordinate with certification of specialists by the certifying boards and also with appointments on the staffs of hospitals and other indications of special practice.

The method of practice, whether individual, in partnership or in groups is indicated. Finally an opportunity is given to every physician, dentist and veterinarian to indicate his preference as to the type of service which he will be capable of rendering to the United States during the war.

The Enrolment Form.—On the enrolment form which comes with the questionnaire the physician, dentist or veterinarian voluntarily enrolls himself with the Pro-

curement and Assignment Service. He indicates his first, second, third and fourth preferences of the military, governmental, industrial or civil categories that may require his assistance.

Announcement will be made repeatedly in medical, dental and veterinary medical publications of the time when the circulation of the enrolment form and the questionnaire begins. When you receive your enrolment form and questionnaire, PLEASE ACT PROMPTLY. Those who fail to receive an enrolment form and questionnaire are requested to write to the National Roster of Scientific and Specialized Personnel, 916 G Street N.W., Washington, D. C., within six weeks after announcement has been made that the circulation has begun.

CERTIFICATE AND INSIGNIA

Physicians, dentists and veterinarians who enroll with the Procurement and Assignment Service will receive a numbered certificate indicating that they have made themselves available and will be privileged to wear insignia indicating that such enrolment has been made.

PROCEDURE TO MEET PRESENT NEEDS

The present Army and Navy needs are for physicians under 36 years of age. Those under 36 desiring immediate commission may write now to the Procurement and Assignment Service, 601 Pennsylvania Avenue N.W., Washington, D. C. Their letters will be treated as applications and those who are qualified will receive proper application forms with view of commission in the Army or the Navy. All physicians over 36 and all dentists and veterinarians should await the receipt of the enrolment forms.

METHODS OF ACTION OF THE PROCUREMENT AND ASSIGNMENT SERVICE

By authority of the President, the Procurement and Assignment Service receives requests for personnel from the following governmental agencies:

MEDICAL

United States Army Medical Corps.
United States Navy Medical Corps.
United States Public Health Service.
United States Veterans Administration.
United States Civil Service Agencies.
St. Elizabeth's Hospital (Washington, D. C.), Resident Staff and Interns only.
United States Indian Service.
Panama Canal Service.
Office of Civilian Defense (full time).

DENTAL

United States Army Dental Corps.
United States Navy Dental Corps.
United States Public Health Service.
United States Veterans Administration.
United States Indian Service.
Panama Canal Service.
Office of Civilian Defense.

VETERINARY

United States Army Veterinary Corps.
United States Navy Hospital Corps Specialists.
United States Public Health Service.
United States Bureau of Animal Industry.
Federal Extension Service.
State Extension Service.
United States Department of Agriculture Marketing Service.
War Department (Federal Civil Service Status—not Army).
Federal Agricultural Experiment Stations.

The Procurement and Assignment Service is also charged with the stimulation of voluntary enrolment, having due regard for the overall health needs of the nation, including the personnel of civilian institutions.

When a request is received from a federal agency for medical, dental or veterinary personnel, the names of those who are qualified to meet the specifications established by the requisitioning agency, who are available and who have indicated by enrolling with the Procurement and Assignment Service, their willingness to apply for a commission or employment are supplied by the National Roster, utilizing the punch card system previously described. These names are arranged in lists by states. A copy of each list is forwarded to the Consultant Office of physicians, dentists or veterinarians respectively, where each is made more accurate by the elimination of the names of those who do not qualify in view of the special information held in the Consultant Office. These lists are then referred to the state chairmen, who make a decision as to the immediate availability of the physicians, dentists or veterinarians concerned. Such a step is necessary because the availability of the individual may have changed in the period between the return of the official questionnaire in March 1942 and the time when the physician, dentist or veterinarian is notified of the need for his services. The lists are then forwarded by the state chairmen to the Procurement and Assignment Service in Washington.

From these lists the central office obtains the names of those individuals who have thus been found qualified and available.

PHYSICIANS, DENTISTS OR VETERINARIANS FOR THE UNITED STATES ARMY MEDICAL DEPARTMENT

The procedure with reference to supplying personnel to the United States Army Medical Department is governed by the following letter of instruction sent out by the Adjutant General's Office to all corps area and department commanders on Jan. 21, 1942:

WAR DEPARTMENT

The Adjutant General's Office
Washington

January 21, 1942

Subject: Procurement of Officers for Medical Department, Army of the United States.

To: All Corps Area and Department Commanders.

1. Letter from this office dated Feb. 3, 1941, file AG 381 (8-13-40) R-A, Subject: "Assistance of the American Medical Association in the classification and procurement of physicians for military service," is rescinded.

2. There has been established under the Office for Emergency Management, Office of Defense Health and Welfare Services, a Procurement and Assignment Service to coordinate the procurement of physicians, dentists and veterinarians for all governmental, industrial and civilian requirements.

3. In order to expedite appointments in the Medical Corps, Dental Corps and Veterinary Corps, Army of the United States, the following procedure will govern the processing of all applications:

(a) All individual inquiries for information concerning a commission or offers to serve as a medical, dental or veterinary officer should be acknowledged by the headquarters receiving the communication and the communication itself forwarded by indorsement to the Executive Officer, Procurement and Assignment Service, Office of Defense Health and Welfare Services, Social Security Building, Washington, D. C.

(b) The Procurement and Assignment Service will supply to individual applicants who are eligible and qualified for appointment the required forms (WD AGO Form No. 170, "Applica-

tion for Appointment and Statement of Preferences for Reserve Officers," in duplicate, and WD AGO Form No. 178 and 178-2, both in duplicate) together with a request on the surgeon of the nearest Army post for a final type physical examination. Each request for final type physical examination authorized by the Procurement and Assignment Service will be honored by surgeons of Army posts. Application forms and supporting papers, except the report of physical examination, will be returned by the applicant to the Procurement and Assignment Service; the report of physical examination (WD AGO Form No. 63) will be forwarded by the surgeon of the station at which the examination was conducted, direct to the Surgeon General.

(c) The completed applications and supporting papers, except report of physical examination, will be transmitted by the Procurement and Assignment Service to the Surgeon General together with a statement by that service derived from its files and regarding eligibility of the applicant for appointment in the Medical, Dental and Veterinary Corps, Army of the United States, as prescribed by current Army regulations. The Procurement and Assignment Service will also furnish the Surgeon General with the professional classification and evaluation of the applicant as determined from the recent nationwide survey made by the Committee on Medical Preparedness of the American Medical Association.

(d) The Surgeon General will forward such completed applications to the Adjutant General as prescribed in paragraph 10 (4), Army Regulations No. 605-10, and inform the Procurement and Assignment Service of action recommended.

4. No change in the present procedure for the appointment of graduates of medical units of the Reserve Officers' Training Corps in the Medical Corps Reserve or for appointment in the Army of the United States of physicians and dentists for affiliated units, of junior and senior students in medical schools in the Medical Administrative Corps, Army of the United States, or of graduates of such schools who are to be appointed in the Medical Corps, Army of the United States, on graduation.

5. When the applications for appointment have been approved the Adjutant General will notify the applicant direct of his appointment with instructions as to proper completion of oath of office and finger print card and the return of such forms direct to the Adjutant General. When the oath of office has been received by the Adjutant General, the Surgeon General and the Executive Officer, Procurement and Assignment Service of the Office of Defense Health and Welfare Services, Office for Emergency Management, Washington, D. C., will be notified.

By order of the Secretary of War.

(Note: Address now 601 Pennsylvania Avenue N.W., Washington, D. C.)

In summary, the procedure is as follows:

1. The Surgeon General requisitions needed personnel from the Central Office of the Procurement and Assignment Service.

2. The National Roster prepares an appropriate list of names from the National Roster of Scientific and Specialized Personnel.

3. The National Roster sets aside the cards from the file of those available.

4. This list is forwarded to the Consultant Office, Procurement and Assignment Service.

5. The Consultant Office forwards the names to the chairmen of relevant state committees of the Procurement and Assignment Service.

6. These chairmen forward to the central office the lists they received, with names of unavailable (essential) persons indicated.

7. The Central Office mails application forms and authority for physical examination to the qualified and available proposed applicants.

8. Each applicant applies for "final type" physical examination at the nearest Army post.

9. The examiner sends the report to the Surgeon General's Office.

10. The applicant returns his completed application blank and supporting papers direct to the Central Office of the Procurement and Assignment Service.

11. The central office forwards the application form and the supporting papers direct to the Surgeon General.

12. The Surgeon General's Office joins the completed application blank, supporting papers and the corresponding report of physical examination.

13. The Surgeon General's Office determines whether or not to recommend the applicant to the Adjutant General on the basis of physical and professional qualifications.

14. The Adjutant General notifies the applicant that he has or has not been appointed.

15. The Central Office of the Procurement and Assignment Service is notified whether the applicant has been, or has not been, appointed.

16. The names of those not commissioned are again placed in the file of the National Roster so that the persons affected may be available for other service.

NOTE.—After the applicant has sent his application form and supporting papers to the Central Office of the Procurement and Assignment Service, he may expect his further correspondence to be carried on with the Surgeon General's Office or the Adjutant General's Office.

PROVISION OF PHYSICIANS AND DENTISTS FOR THE UNITED STATES NAVY MEDICAL AND DENTAL CORPS

When a request is received from the United States Navy Medical or Dental Corps for personnel, the same procedure will be followed in securing lists of names as has already been described in the previous section regarding the provision of personnel for the Army. The lists of names received from the state chairman will then be forwarded by the Procurement and Assignment Service to the Bureau of Medicine and Surgery, Navy Department, Washington, D. C. The Bureau of Medicine and Surgery will then conduct negotiations with the physicians and dentists concerned through the commandants of their respective naval districts. Should a physician or dentist apply directly to a naval commandant for commission in the United States Naval Medical or Dental Corps, the procedure outlined in the following letter from the Bureau of Medicine and Surgery to the commandants of all naval districts, dated Feb. 3, 1942, prevails:

February 3, 1942.

From: The Chief of the Bureau of Medicine and Surgery.
To: The Commandant, All Naval Districts.
Subject: Status of Procurement and Assignment Service for Physicians, Dentists and Veterinarians in connection with recruitment of medical and dental officers for the U. S. Naval Reserve.

1. The Secretary of the Navy has approved the recommendations of the Chief of the Bureau of Medicine and Surgery whereby the services of the "Procurement and Assignment Service, of the Defense Health and Welfare Services," an organization recently created by the President, may be utilized by the Navy in facilitating the recruitment of medical and dental officers for the U. S. Naval Reserve.

2. The primary function of the above mentioned service as pertains to the Navy is to furnish information which indicates certain applicants for appointment in the Medical and Dental Corps of the Naval Reserve either do or do not occupy positions in civil life which are considered essential to the national defense, to the proper functioning of medical and dental schools or whose acceptance of appointments in the Naval Reserve would jeopardize the health and welfare of a local community;

such as removing the only qualified orthopedic surgeon from a community composed practically entirely of miners or workers in a factory producing materials essential to the government.

The furnishing of such information to the commandants, before investigation of an applicant, would be of distinct advantage in that the number of investigations would be materially reduced and, in the case of applicants considered essential or holding civilian appointments connected with national defense, need not be accomplished.

3. In this connection, the following procedure is suggested with the request that it be executed by the District Medical Officer on all applications received after Feb. 16, 1942:

(a) Whenever a physician or dentist makes application for appointment, four copies of the enclosed form are to be immediately filled out and the original and two copies forwarded to the Bureau of Medicine and Surgery. It is desired these forms be forwarded when the first contact is made in any given case, without waiting for the applicant to return his completed application.

(b) The Bureau of Medicine and Surgery will retain one copy and send the original and one copy to the Executive Secretary of the Procurement and Assignment Service.

(c) When the Executive Secretary of the Procurement and Assignment Service has placed his endorsement thereon, he will return both copies to the commandant concerned.

(d) If the candidate is not cleared, both copies should be forwarded by the commandant to the Bureau of Medicine and Surgery and the candidate informed by the commandant his application cannot be accepted in view of the action of the Procurement and Assignment Service. The Bureau of Medicine and Surgery will make the second endorsement, retain the original and forward the copy to the Executive Officer of the Procurement and Assignment Service.

(e) If the candidate is cleared, both the original and the copy of the form should be forwarded to the Bureau of Navigation with the application. After final action is taken the Bureau of Medicine and Surgery will make the second endorsement, retain the original and forward the copy to the Executive Officer of the Procurement and Assignment Service.

(f) About fifty copies of the form adaptable for this purpose are enclosed to serve as a sample of others to be mimeographed or printed locally.

ROSS T. MCINTIRE.

In summary, the procedures for Navy procurement are as follows:

1. The Bureau of Medicine and Surgery requisitions personnel from the central office of the Procurement and Assignment Service.

2. An appropriate list of names is prepared from the National Roster of Scientific and Specialized Personnel.

3. The National Roster sets aside the cards bearing these names from the file of those available.

4. The list is forwarded to the Consultant Office, Procurement and Assignment Service.

5. The Consultant Office forwards the names to the chairmen of relevant state committees of the Procurement and Assignment Service.

6. These chairmen forward to the central office the lists they received, with names of unavailable (essential) persons indicated.

7. The central office forwards the names of qualified and available persons to the Bureau of Medicine and Surgery.

8. The Bureau of Medicine and Surgery conducts the subsequent negotiations with the proposed applicants.

9. The Bureau of Medicine and Surgery notifies the central office of the Procurement and Assignment Service which applicants have been and which have not been appointed.

10. The names of those not commissioned are again placed in the file of the National Roster, so that the persons affected may be available for other services.

When an applicant applies directly to any Army installation for commission in the Army Medical or Dental or Veterinary Corps, he is referred to the Procurement and Assignment Service. When an applicant applies to any Naval Commandant for commission in the U. S. Medical or Dental Corps, his application is sent to the Bureau of Medicine and Surgery and such names are cleared through the Procurement and Assignment Service before the commissions are granted.

UNITED STATES PUBLIC HEALTH SERVICE

The Surgeon General of the United States Public Health Service has issued the following circular to all District Directors and Medical Officers in Charge concerning new appointment procedure for physicians and dentists:

February 14, 1942.

1. The Procurement and Assignment Service within the Office of Defense Health and Welfare Services has the responsibility for assisting in the procurement and assignment of physicians and dentists in such manner as to best serve the over-all health and medical needs of the country. It is essential that the personnel policy of the Public Health Service be consistent with the major purposes of the Procurement and Assignment Service.

2. It is desired that applications be solicited from qualified physicians and dentists for commission in the reserve corps of the U. S. Public Health Service. The expansion of the reserve corps of the Public Health Service is necessary to serve two major purposes:

(a) The creation of a pool of qualified public health personnel to safeguard essential civilian health services and at the same time to be available for immediate, though temporary, active duty in the event of some major public health emergency.

(b) The procurement of sufficient numbers of qualified physicians and dentists to enable the Public Health Service to carry on its normal and war-time activities.

3. In order to serve these two major purposes, it will be necessary to recruit into the reserve of the Public Health Service physicians and dentists who come within the two following categories:

(a) Those who are now engaged in public health work and who by reason of special training and experience occupy strategic positions in their present civilian capacities. Such personnel would be expected to remain on inactive status with the Public Health Service, except in the event of a major disaster, in which case they would be subject to immediate, though temporary, active duty.

(b) Those who are professionally qualified and also available for immediate active duty in the Public Health Service for such periods of time as the exigencies of the service may determine.

4. Applications from physicians and dentists relating to commissions in the reserve of the Public Health Service will be processed in the following manner: On receipt of an application by the office of the Surgeon General, the application forms and all supporting papers, including the report of physical examination, will be transmitted with a definite recommendation of the Surgeon General to the Procurement and Assignment Service. The Procurement and Assignment Service will in turn certify to the Surgeon General as to the availability of the individual for appointment. In the case of public health personnel occupying strategic positions in civilian posts, the criterion of availability for commission would rest largely upon the fact that the individual occupies a strategic position, and therefore should remain as long as practicable on an inactive status. In the case of personnel to be called to immediate active duty, the criterion of availability would be based upon the ability of the community to spare the services of the individual. Upon receipt

from the Procurement and Assignment Service of notice of clearance, indicating that the applicant is available for a commission in the reserve of the Public Health Service, the appointment will be completed in the usual manner.

5. The above procedure does not apply to the recruiting of individuals for the regular corps of the Public Health Service, or to the appointment of interns or doctors certified by the Civil Service Commission, or to the appointment of sanitary engineer officers in the reserve.

6. When the Public Health Service is without acceptable applications from physicians and dentists for filling vacancies, the Surgeon General will request the Procurement and Assignment Service for the names and qualifications of persons available to fill such vacancies. When decision has been reached as to the selection or nonselection of such persons, the Surgeon General will advise the Procurement and Assignment Service.

7. The Procurement and Assignment Service has given its endorsement to the procedure outlined above.

Approved:

PAUL V. McNUTT,
Administrator.

THOMAS PARRAN,
Surgeon General.

UNITED STATES CIVIL SERVICE COMMISSION

In accordance with the recommendation of the Medical Director, the United States Civil Service Commission has approved a procedure in connection with the recruitment of qualified persons whereby the Commission will cooperate with the Procurement and Assignment Service and deal directly with this service in its recruitment program.

1. The necessary application forms, all properly executed, are to be filed by the applicant with the United States Civil Service Commission at Washington, D. C. Information concerning necessary qualifications is to be obtained from the announcement of the examination. Application forms and announcements may be obtained from the United States Civil Service Commission, Washington, D. C.

2. Applications received under announcements of examinations for physicians, dentists and veterinarians will be rated by the United States Civil Service Commission.

3. The names of those applicants who have received an eligible rating will be submitted to the Procurement and Assignment Service, with the view of determining whether or not such applicants are essential in their present positions and localities.

4. The names of those persons who have been designated by the Procurement and Assignment Service as being essential in their present positions and localities will not be certified and such persons will be notified by the United States Civil Service Commission that they cannot be certified in view of the action taken by the Procurement and Assignment Service.

5. The names of those persons who have been designated as nonessential will be certified in routine manner to fill the personnel needs of the various government agencies under civil service rules and regulations.

MEDICAL, DENTAL AND VETERINARY EDUCATION

To meet the needs of the nation for a continuing supply of trained medical, dental and veterinary personnel for the armed forces and for civilian needs, and to maintain the standards of education which have prevailed in these fields, the medical, dental and veterinary professions initiated an effort as far back as 1940 to provide for deferment of students in qualified medical, dental and veterinary schools from induction under the provisions of the Selective Service acts. Through the cooperation of the Director of Selective Service, the following memorandums now prevail:

Deferments of Professional Students and Instructors.
—The Selective Service System, Washington, D. C.,

on January 12, 1942, issued the following supplement to Memoranda (I-62), (I-91), (I-99) and (I-150) Occupational Deferment of Engineering, Chemical, Physics, Medical, Dental Students and Instructors (III):

The attention of local boards is again invited to the necessity of seriously considering for deferment students in certain specialized professional fields in which dangerously low levels of manpower are found to exist. This memorandum is in addition to and does not rescind those previously issued which apply to students in other critical fields.

Subsequent to the declaration of war, local Selective Service agencies have in many instances proceeded to classify registrants without regard to the fact that they are in training or preparation for activities the maintenance of which is essential to the national health, safety or interest and war production. This is particularly true in cases of engineering, chemical, physics, medical and dental students.

Admittedly there is an overlapping of the military and civilian requirements of a nation at war; however, it must be borne in mind that the one is dependent on the other. It is estimated that the expanding army will eventually require doctors and dentists in numbers heretofore unknown. They will not be available if those students who show reasonable promise of becoming doctors and dentists are inducted prior to becoming eligible for commissions.

War industries are undergoing a hitherto unknown expansion. Aeronautical, civil, electrical, chemical, mining, metallurgical, mechanical and radio engineers together with physicists and chemists are essential to insure a sufficient flow of material for the armed forces, and industry must look to the engineering, chemical and physics students now in training to meet their present and future requirements.

It is equally important that instructors in these fields be seriously considered for occupational deferment. Shortages of qualified instructors are known to exist. The educational institution employing the instructor should be requested to file DSS Form 42A in all cases in which deferment is sought.

In considering student deferment cases, certain local boards are requiring the execution of DSS Form 42A in addition to the affidavit of the college or university contained in Bulletin No. 10 issued by the American Council on Education. DSS Form 42A should not be required when the American Council on Education affidavit has been submitted.

Local boards will be informed when the manpower requirements necessary to the national health, safety or interest and war production become static. Until such time, the policy set forth in the Memoranda to All State Directors I-62, I-91, I-99 and I-150 remains in force.

LEWIS B. HERSHEY, Director.

All students holding letters of acceptance from deans for admission to dental and veterinary colleges and all students of good academic standing in these colleges should present letters or have letters presented for them by their deans to their local boards of the Selective Service System. All premedical students who have letters of acceptance from deans for admission to medical colleges but who have not actually matriculated should present these letters. This step is necessary in order to be considered for deferment in class II-A as a medical, dental or veterinary student. If local boards classify such students in class I-A, they should immediately notify their deans and, if necessary, exercise rights of appeal to their local boards of appeals. If, after exhausting such rights of appeal, further consideration is necessary, request for further appeal may be made to the state directors and if necessary to the national director of the Selective Service System. These officers have the power to take appeals to the President.

On January 28, 1942, the following memorandum (I-363) was released by the Director of Selective Service to all state directors of the Selective Service System.

OCCUPATIONAL DEFERMENTS OF MEDICAL DOCTORS,
DENTISTS AND DOCTORS OF VETERINARY MEDICINE

Information previously distributed by this headquarters clearly indicates an overall shortage of medical doctors, dentists and doctors of veterinary medicine in the nation. Since war was declared, the shortage of these professional men has become acute. It is now manifest that every qualified doctor, dentist and veterinarian must serve where he can render the greatest professional service to the nation.

In order to accomplish this purpose, the President, by Executive Order, has formed the Procurement and Assignment Service, under the Office of Defense Health and Welfare Services. This Service was formed primarily for the purpose of gathering and making available information with respect to the supply of qualified practitioners in the fields of medicine, dentistry and veterinary medicine, with a view of securing the most effective allocation of medical manpower as indicated by the requirements of the armed forces, civilian needs and industrial medicine.

To work with the headquarters of this Service in Washington, there is being organized a committee for each Corps Area in the Continental United States. Each committee will consist of five doctors, two dentists and one veterinarian. The committees have been accepted as advisers to the nine Corps Area Surgeons, to the Naval District Surgeons and to the Regional Medical Officers of the Office of Civilian Defense and will operate not only through the subdivisions of the medical, dental and veterinary associations but also with the profession at large in securing information and giving advice.

When considering the classification of any registrant who is a qualified medical doctor, dentist, or doctor of veterinary medicine, the Director of Selective Service desires that local boards, through the State Director, shall consult the Procurement and Assignment Committee of the Corps Area for information as to the availability of qualified medical doctors, dentists and doctors of veterinary medicine in the community. This information shall be considered by the local board in determining the registrant's classification. The Executive Order referred to in no way affects the authority of the Selective Service System to classify registrants. The procedure has been established for the purpose of making such information available to local boards.

For the convenience of the State Director and the local boards, the names and addresses of the Chairmen of the Nine Corps area committees of the Procurement and Assignment Service are listed:

First Corps Area: Dr. W. G. Phippen, Salem, Mass.
Second Corps Area: Dr. A. W. Booth, Elmira, N. Y.
Third Corps Area: Dr. A. M. Shipley, Baltimore, Md.
Fourth Corps Area: Dr. Edgar Greene, Atlanta, Ga.
Fifth Corps Area: Dr. E. L. Henderson, Louisville, Ky.
Sixth Corps Area: Dr. Charles H. Phifer, Chicago, Ill.
Seventh Corps Area: Dr. Roy W. Fouts, Omaha, Neb.
Eighth Corps Area: Dr. Sam E. Thompson, Kerrville, Texas.
Ninth Corps Area: Dr. Charles A. Dukes, Oakland, Calif.

LEWIS B. HERSHEY, Director.

DEFERMENT FOR STUDENTS

The Secretary of the Navy recently approved a change in Navy regulations whereby it is now possible for persons who have been accepted for entrance in the next entering class and all medical students in class A medical colleges and approved dental colleges to be appointed in the United States Naval Reserve with the commission Ensign H-V (P), provided they meet the physical and other requirements for such appointment. It should be noted that this applies not only for

persons holding letters of acceptance and freshmen and sophomore students in these medical and dental schools but also juniors and seniors.

The Secretary of War has recently approved a change in Army Regulations which authorizes the commission as Second Lieutenant, Medical Administrative Corps, Army of the United States, of all students in class A medical colleges and to those persons who have matriculated in these colleges, providing they meet the physical and other requirements for such appointment. It should be noted that this opportunity includes freshmen and sophomores as well as juniors and seniors.

For commission in the Navy, application forms may be obtained from the dean's office or from some one designated by him, or from the commandant of the naval district in which the applicant resides. Further information may be obtained from the office of the commandant of any naval district.

For commission in the Army, applications should be made through the office of the dean to the corps area surgeon of the corps area in which the applicant resides.

Students of the Medical Reserve Officers' Training Corps should continue as before, with a view of obtaining commissions as First Lieutenant, Medical Reserve Corps, on graduation.

Students who hold commissions come under the jurisdiction of the Army and Navy authorities and are not subject to induction under the Selective Service acts. The Army and Navy authorities will defer calling these officers to active duty until they have completed their medical education.

All students who are disqualified physically for commissions should apply for deferment in accordance with the instructions already referred to.

RECENT GRADUATES

After successful completion of his medical college course every individual holding commission as Second Lieutenant, Medical Administrative Corps, Army of the United States, should make immediate application to the Adjutant General, United States Army, Washington, D. C., for appointment as First Lieutenant, Medical or Dental Corps, Army of the United States. Every individual holding commission as Ensign H-V (P), U. S. Naval Reserve, should make immediate application to the commandant of his naval district for commission as Lieutenant (j. g.), Medical or Dental Corps Reserve, U. S. Navy. If appointment is desired in the grade of Lieutenant (j. g.) in the regular Medical Corps or Dental Corps of the U. S. Navy, application should be made to the Bureau of Medicine and Surgery, Navy Department, Washington, D. C.

The Public Health Service contacts senior and junior medical students for the purpose of interesting the students in applying for positions as interns, following the successful completion of the school year. In addition the students that are accepted are offered commissions in the reserve, to be inactive during the period of their internship and to become active following the successful completion of their internship.

TWELVE MONTHS INTERNS

All interns should apply for commissions as First Lieutenant, Medical or Dental Corps, Army of the United States, or as Lieutenant (j. g.), United States

Navy or Naval Reserve. After completion of twelve months' internship, except in rare instances in which the necessity of continuation as a member of the staff or as a resident can be defended by the institution, all who are physically fit may be required to enter military service. Those commissioned may then expect to enter military service in their professional capacity as medical or dental officers.

HOSPITAL STAFF MEMBERS

Interns with more than twelve months of internship, assistant residents, fellows, residents, junior staff members and staff members under the age of 45 fall within the provisions of the Selective Service acts.

All such men holding Army commissions are subject to call at any time. Temporary deferment is possible if an application made by the institution to the Adjutant General of the United States Army certifying that the individual is temporarily indispensable is approved.

All such men holding Naval Reserve commissions are subject to call at any time, at the discretion of the Secretary of the Navy. Temporary deferments are granted only on approval of applications made by the institution to the Surgeon General of the Navy.

THOSE UNDER 45

All male physicians, dentists or veterinarians under 45 are liable for military service. That their services may be utilized in a professional capacity as officers, they should be made available through the facilities of the Procurement and Assignment Service. Wherever possible, their present positions in civil life should be filled or provisions made for filling their positions, if necessary, by (a) those who are over 45, (b) those under 45 who are physically disqualified for military service, (c) women and (d) instructors and those engaged in research who do not possess M.D., D.D.S. or D.V.M. degrees but whose utilization would make available physicians, dentists or veterinarians for military service.

THOSE OVER 45

All physicians, dentists or veterinarians over 45 should enroll with the Procurement and Assignment Service. Every possible effort will be made to retain those who are essential in their present capacities. Those who are available for assignment to military, governmental, industrial or civil agencies may be asked by the Procurement and Assignment Service to serve those agencies.

MAINTAINING EDUCATIONAL, INDUSTRIAL AND CIVILIAN MEDICAL, DENTAL AND VETERINARY SERVICES

Faculties of Schools.—Authorities in medical, dental and veterinary schools have forwarded lists to the Procurement and Assignment Service containing the names of members of their faculties who are considered essential to a proper continuation of medical, dental and veterinary education. These lists will be consulted in determining those who are considered essential. Should the status of any individual listed as essential for teaching be changed, the Procurement and Assignment Service should be immediately notified by the college authorities.

Research.—The burden of proof as to the essential character of research set forth as a reason for deferment rests on the individual and the employing institution.

Efforts will be made to maintain without interruption the progress of scientific research, particularly that related to the war effort.

Civil Practice.—The Procurement and Assignment Service will do its utmost to maintain a supply of medical, dental and veterinary services for all industrial and civilian needs. Already the state and county medical, dental and veterinary societies, under the direction of state chairmen, are assembling lists of physicians, dentists and veterinarians considered essential in the positions they now occupy.

ADVISORY COMMITTEES AND LIAISON OFFICERS

On recommendations of the Directing Board of the Procurement and Assignment Service, the Office of Defense, Health and Welfare Services has appointed the following advisory committees and consultants to the Procurement and Assignment Service: Dentistry, Veterinary Medicine, Hospitals, Women Physicians, Industrial Health and Medicine, Medical Education, Negro Physicians and Public Health.

These committees are advisory to the Directing Board in establishing policies regarding the availability and utilization of personnel in their respective fields.

THE COMMITTEE ON INFORMATION

With its consultants, the Committee on Information is charged with disseminating information to all physicians, dentists and veterinarians and to the public in order that they may be kept informed of the progress of the Procurement and Assignment Service, and in order to secure their cooperation in its activities (appendix 1).

LIAISON OFFICERS

Each of the governmental agencies utilizing the services of physicians, dentists and veterinarians has appointed a liaison officer to advise and assist the Procurement and Assignment Service (appendix 1).

SPECIAL INFORMATION

Specialization.—In general, determination as to special qualifications of persons entering the medical services of the Army and Navy depends on the classification of specialists by advisory committees established through the Division of Medical Sciences of the National Research Council and certifications of boards in the various specialties. Moreover, the recommendations of state and county committees and the statements of the individuals on questionnaires will be taken into consideration. On questions of dental and veterinary specialization, the official organization will be consulted.

Citizenship.—Regulations of the United States Army and Navy do not permit the commissioning of officers who are not citizens of the United States. A commission in the United States Navy requires full citizenship for a period of ten years, and the ten year period to have been spent in the United States. Similarly, all federal agencies utilizing physicians, dentists and veterinarians now demand citizenship as a prerequisite to such enrolment.

Persons who do not possess full citizenship papers but who have been licensed to practice in any of the states of the United States should enroll with the Procurement and Assignment Service so that their services may be utilized when the opportunity arises. They

should, however, do their utmost to continue in their efforts to secure citizenship to enable them to qualify for positions that they are not able to fill because of lack of these essentials.

Physicians, dentists or veterinarians who have their first citizenship papers but who do not have a license to practice and who are under the age of 45 come within the provisions of the Selective Service acts and may be inducted in the capacity of enlisted men. When this occurs, these should make known their special capacities, so that their services may be utilized to the fullest extent in the medical departments of the Army and Navy in an enlisted capacity.

College Qualifications.—Commissions in the medical departments of the United States Army and Navy and in federal agencies are granted only to graduates of schools recognized by such agencies. For physicians, twelve months of internship or its equivalent is required.

Those wishing further information concerning the qualifications necessary to appear for examination leading to a commission in the Army or Navy or to service with any other governmental service should apply directly to such agency.

Women Physicians, Dentists and Veterinarians.—The United States Army and Navy do not permit the commissioning of women physicians, dentists or veterinarians. However, all should enroll with the Procurement and Assignment Service so that they may be recommended to such positions as are available in other federal agencies, industry or civilian capacities in which their services may be required.

The needs will no doubt be particularly acute in local, state and national institutions, in teaching and staff positions and in special occupations with the Office of Civilian Defense in the care of women and children under emergency conditions.

APPENDIX I.—PROCUREMENT AND ASSIGNMENT SERVICE.—CENTRAL ORGANIZATION

OFFICE OF DEFENSE HEALTH AND WELFARE SERVICES

DIRECTING BOARD

- Dr. Frank H. Lahey, Chairman, President, American Medical Association, 605 Commonwealth Avenue, Boston.
- Dr. Harvey B. Stone, Vice Chairman, Associate Professor of Surgery, Johns Hopkins University School of Medicine, 18 West Franklin Street, Baltimore.
- Dr. C. Willard Camalier, Chairman, Dental Preparedness Committee, American Dental Association, 1726 Eye Street N.W., Washington, D. C.
- Dr. Harold S. Diehl, Dean of Medical Sciences, University of Minnesota, Minneapolis.
- Dr. James E. Paullin, 384 Peachtree Street N.E., Atlanta, Ga.
- Dr. Sam F. Seeley, Executive Officer.

LIAISON OFFICERS

- Major Paul A. Paden, M. C., Office of the Surgeon General, War Department, Room 1113-B, 1818 H Street N.W., Washington, D. C.
- Commander Thomas B. Megath, Medical Officers Reserve Section, U. S. Navy, Washington, D. C.
- Dr. Paul M. Stewart, U. S. Public Health Service, 23d and Constitution Avenue N.W., Washington, D. C.
- Lieut. Col. Richard H. Eanes, M. C., *Selective Service System*, Potomac Park Apartment, 21st and C streets N.W., Washington, D. C.
- Dr. Hugo Mella, Veterans Administration, Washington, D. C.
- Dr. George Baehr, Chief Medical Officer, Office of Civilian Defense, DuPont Circle Building, Washington, D. C. Tel. Republic 5050, Ext. 505.
- Dr. Edwin F. Daily, Director, Division of Health Services, Children's Bureau, Department of Labor, Washington, D. C.
- Dr. Verne K. Harvey, U. S. Civil Service Commission, Washington, D. C.

ADVISORY COMMITTEES

DENTISTRY

- Dr. John T. O'Rourke, Chairman, Dean of Dental School, University of Louisville, Louisville, Ky.
- Dr. Leroy M. S. Miner, Vice Chairman, Dean of Dental School, Harvard University, Boston.

- Dr. Frederick B. Noyes, 55 E. Washington Street, Chicago.
- Dr. Guy S. Millberry, R. F. D. No. 2, Box 181, Los Gatos, Calif.
- Dr. B. K. Westfall, 1006 Hume-Mansur Building, Indianapolis.

CONSULTANT

- Dr. Gerald D. Timmons, Executive Secretary, American Dental Association, 212 East Superior Street, Chicago.

HOSPITALS

- Dr. Winford H. Smith, Chairman, Director, Johns Hopkins Hospital, Baltimore.
- Dr. Nathaniel W. Faxon, Vice Chairman, Director, Massachusetts General Hospital, Boston.
- Dr. Claude W. Munger, Director, St. Luke's Hospital, 421 W. 113th Street, New York.
- Dr. M. T. MacEachern, Associate Director, American College of Surgeons, 40 East Erie Street, Chicago.
- Rev. Fr. Alphonse M. Schwitalla, Dean, St. Louis University School of Medicine, 1402 South Grand Boulevard, St. Louis.

INDUSTRIAL HEALTH AND MEDICINE

- Dr. C. D. Selby, Chairman, Medical Director, General Motors Corporation, Detroit.
- Dr. A. J. Lanza, Vice Chairman, Assistant Medical Director, Metropolitan Life Insurance Company, 1 Madison Avenue, New York.
- Mr. William Yant, Director of Research and Development, Mine Safety Appliance Company, Braddock, Thomas & Meade streets, Pittsburgh.
- Dr. Lloyd Noland, Chief Surgeon, Tennessee Coal, Iron and Railroad Company, Fairfield, Ala.
- Dr. E. C. Holmblad, 28 East Jackson Boulevard, Chicago.
- Professor Philip Drinker, Department of Industrial Hygiene, School of Public Health, Harvard University, 55 Shattuck Street, Boston.
- Dr. George M. Smith, Department of Anatomy, Yale University School of Medicine, New Haven, Conn.

MEDICAL EDUCATION

- Dr. C. Sidney Burwell, Chairman, Dean, Harvard University Medical School, 25 Shattuck Street, Boston.
- Dr. William S. Middleton, Vice Chairman, Dean of Medical School, University of Wisconsin, 1300 University Avenue, Madison, Wis.
- Dr. Willard C. Rappleye, Dean, College of Physicians and Surgeons, Columbia University, 630 West 168th Street, New York.
- Dr. John H. Musser, Professor of Medicine, Tulane University School of Medicine, 1430 Tulane Avenue, New Orleans.
- Dr. Loren R. Chandler, Dean, School of Medicine, Stanford University, San Francisco.

NEGRO HEALTH

- Dr. M. O. Bousfield, Chairman, Director of Negro Health, Julius Rosenwald Fund, 4901 Ellis Avenue, Chicago.
- Dr. Russell A. Dixon, Vice Chairman, Dean, College of Dentistry, Howard University, Washington, D. C.
- Dr. G. Hamilton Francis, 1024 East Liberty Street, Norfolk, Va.
- Mr. A. W. Dent, Superintendent, Flint Goodridge Hospital, New Orleans.
- Dr. A. N. Vaughn, Surgeon, Homer G. Philips Hospital, St. Louis.

PUBLIC HEALTH

- Dr. Carl V. Reynolds, Chairman, 216 West Jones Street, Raleigh, N. C.
- Dr. Harry S. Mustard, Vice Chairman, DeLamar Institute of Public Health, 600 West 168th Street, New York.
- Dr. Gaylord West Anderson, University of Minnesota, Minneapolis.
- Dr. Waller S. Leathers, School of Medicine, Vanderbilt University, Nashville, Tenn.
- Dr. John L. Rice, 125 Worth Street, New York.

VETERINARY MEDICINE

- Dr. John G. Hardenbergh, Chairman, Executive Secretary, American Veterinary Medical Association, 600 South Michigan Avenue, Chicago.
- Dr. John R. Mohler, Vice Chairman, Chief, Bureau of Animal Industry, U. S. Department of Agriculture, Washington, D. C.
- Dr. Harry W. Jakeman, President, American Veterinary Medical Association, 44 Bromfield Street, Boston.
- Dr. William A. Hagan, Dean, New York State Veterinary College, Cornell University, Ithaca, N. Y.
- Dr. Cassius Way, 25 Vanderbilt Avenue, New York.

WOMEN PHYSICIANS

- Dr. Sara Murray Jordan, Chairman, 605 Commonwealth Avenue, Boston.
- Dr. Margaret D. Craighill, Vice Chairman, Dean, Woman's Medical College of Pennsylvania, East Falls, Philadelphia.
- Dr. Ruth Evelyn Boynton, University of Minnesota, Minneapolis.
- Dr. Ada Chree Reid, Executive Secretary, American Medical Women's Association, 102 E. 22d Street, New York.
- Dr. Irma Jackson, Forest Hills Inn, Forest Hills, N. Y.

INFORMATION

Dr Morris Fishbein, Chairman, Editor, Journal American Medical Association, 535 North Dearborn Street, Chicago

Dr Ira V Hiscock, Vice Chairman, Yale University School of Medicine, New Haven, Conn

Mr J J Bloomfield, Sanitary Engineer, U S Public Health Service, National Institute of Health, Bethesda, Md

Dr John F Fulton, Yale University School of Medicine, 333 Cedar Street, New Haven, Conn

Dr Richard M Hewitt, Mayo Clinic, Rochester, Minn

Dr Sanford V Larkey, Division of Medical Sciences, National Research Council, 2101 Constitution Avenue, Washington, D C

Dr Robert N Nye, Managing Editor, New England Journal of Medicine, 8 Fenway, Boston

CONSULTANTS

Mr Watson Davis, 1719 N Street NW, Washington, D C

Mr David Dietz, Science Editor, Scripps Howard Newspapers, United Press, Cleveland Press Building, Cleveland

Mr William Laurence, New York Times, New York

Mr Arthur T Robb, Editor of Editor and Publisher, 1475 Broadway, New York

Dr Gerald D Timmons, Executive Secretary, American Dental Association, 212 East Superior Street, Chicago

Dr John G Hardenbergh, Executive Secretary, American Veterinary Medical Association, 600 South Michigan Avenue, Chicago

APPENDIX 2—REGIONAL ORGANIZATIONS

FIRST CORPS AREA

CORPS AREA COMMITTEE

Chairman—Dr W G Phippen, 31 Chestnut Street, Salem, Mass

Physicians—Dr Deering G Smith, 77 Main Street, Nashua, N H, Dr Lucius Kingman, 76 Waterman Street, Providence, R I

Dentist—Dr Philip E Adams, 106 Marlboro Street, Boston

Veterinarian—Dr R W Smith Concord, N H

Hospital Representative—Dr Nathaniel Faxon, Massachusetts General Hospital, Boston

Medical Education Representative—Dr C Sidney Burwell, 25 Shattuck Street, Boston

STATE CHAIRMEN IN FIRST CORPS AREA

CONNECTICUT

Medical—Dr Creighton Barker, 258 Church Street, New Haven

Dental—Dr Louis R Siegal, 750 Main Street, Hartford

Veterinary Medical—Dr Edwin Lutinen, 993 N Main Street, West Hartford

MAINE

Medical—Dr John G Towne, 135 Main Street, Waterville

Dental—Dr Giles C Grant, 655 Congress Street, Portland

Veterinary Medical—Dr P R Baird, 52 Pleasant Street, Waterville

MASSACHUSETTS

Medical—Dr Reginald Fitz, 319 Longwood Avenue, Boston.

Dental—Dr Andrew J Rafferty, 390 Main Street, Worcester

Veterinary Medical—Dr Harrie W. Peirce, 100 Nashua Street, Boston

NEW HAMPSHIRE

Medical—Dr Deering G Smith, 77 Main Street, Nashua

Dental—Dr William H Putney, 85 Pleasant Street, Concord

Veterinary Medical—Dr R W Smith, State House, Concord.

RHODE ISLAND

Medical—Dr Halsey DeWolf, 199 Thayer Street, Providence

Dental—Dr E C Elliott, 615 Union Trust Bldg., Providence

Veterinary Medical—Dr J S Barber, 560 Pleasant Street, Pawtucket.

VERMONT

Medical—Dr Benjamin F Cook, 46 Nichols Street, Rutland

Dental—Dr Maxwell L Jameson, 69 Pine Street, Burlington

Veterinary Medical—Dr A A Mortimer, 27 Central Street, Randolph.

SECOND CORPS AREA

CORPS AREA COMMITTEE

Chairman—Dr A W. Booth, 222 West Church Street, Elmira, N Y.

Physicians—Dr Samuel J Kopetzky, 71 East 80th Street, New York, Dr W J Carrington, 905 Pacific Avenue, Atlantic City, N J

Dentists—Dr William McG Burns, 80 Hanson Place, Brooklyn,

Dr Allen T Newman, 209 East 23d Street, New York

Veterinarian—Dr R R Birch, Route 2, Ithaca N Y

Hospital Representative—Dr Claude W Munger, St Luke's Hospital, New York

Medical Education Representative—Dr Willard C Rappleye, Columbia University Medical School, New York

STATE CHAIRMEN IN SECOND CORPS AREA

DELAWARE

Medical—Dr William H Speer, 917 Washington Street, Wilmington

Dental—Dr William Stewart, Medical Arts Building, Wilmington

Veterinary Medical—Dr Harry McDaniel Jr, State Board of Agriculture, Dover

NEW JERSEY

Medical—Dr Charles H Schlichter, 143 E State Street, Trenton

Dental—Dr E C Stillwell, 815 Bloomfield, Glen Ridge

Veterinary Medical—Dr A W Smith, 8 Longview Road, Livingston

NEW YORK

Medical—Dr Samuel J Kopetzky, 71 E 80th Street, New York

Dental—Dr William McG Burns, 80 Hanson Place, Brooklyn

Veterinary Medical—Dr Albert L Brown, Route 1, Adams

THIRD CORPS AREA

CORPS AREA COMMITTEE

Chairman—Dr A M Shipley, University Hospital, Baltimore

Physicians—Dr C H Henninger, 500 Penn Avenue, Pittsburgh, Dr Hugh H Trout, 1301 Franklin Road, Roanoke, Va

Dentists—Dr B Lucien Brun, 827 Park Avenue, Baltimore, Dr Harry Bear, 410 Professional Bldg., Richmond, Va

Veterinarian—Dr Mark Welsh, College Park, Md

Hospital Representative—Dr Winford H Smith, Johns Hopkins Hospital, Baltimore

Medical Education Representative—Dr William Pepper, University of Pennsylvania School of Medicine, Philadelphia

STATE CHAIRMEN IN THIRD CORPS AREA

MARYLAND

Medical—Dr Charles W Maxson, 827 N Charles Street, Baltimore

Dental—Dr T J Bland, Medical Arts Building, Baltimore

Veterinary Medical—Dr A L Brueckner, College Park

PENNSYLVANIA

Medical—Dr Charles H Henninger, 500 Penn Avenue, Pittsburgh

Dental—Dr R H Nones, 1930 Chestnut Street, Philadelphia

Veterinary Medical—Dr Ernest W Hogg, 20 Darling Street, Wilkes Barre

VIRGINIA

Medical—Dr Hugh H Trout, 1301 Franklin Road, Roanoke

Dental—Dr J H John, Medical Arts Bldg., Roanoke

Veterinary Medical—Dr I D Wilson, Virginia Polytechnic Institute, Blacksburg

DISTRICT OF COLUMBIA

Medical—Dr Francis A McGovern, 1835 Eye Street NW, Washington, D C

Dental—Dr George Albert Smith, 1835 Eye Street NW, Washington, D C

Veterinary Medical—Dr A E Wight, Bureau of Animal Industry, U S Department of Agriculture, Washington, D. C

FOURTH CORPS AREA

CORPS AREA COMMITTEE

Chairman—Dr Edgar Greene, 478 Peachtree Street NE, Atlanta, Ga

Physicians—Dr Alfred A Walker, 2250 Highland Avenue, Birmingham, Ala, Dr Edward H Jels P O Box 1018, Jacksonville, Fla

Dentists—Dr Claude R Wood, 606 Medical Arts Building, Knoxville, Tenn, Dr Ralph R Byrnes, 106 Forest Avenue NE, Atlanta, Ga

Veterinarian—Dr B T Simms, Regional Animal Disease Research Laboratory, Auburn, Ala

Hospital Representative—Dr J Moss Beeler, Grady Hospital, Atlanta, Ga

Medical Education Representative—Dr. R H Oppenheimer, 50 Armstrong Street, Atlanta, Ga.

STATE CHAIRMEN IN FOURTH CORPS AREA

ALABAMA

Medical—Dr B F Austin, 519 Dexter Avenue, Montgomery.

Dental—Dr C B Bray, American Cast Iron Pipe Company, Birmingham

Veterinary Medical—Dr R S Suggs, School of Veterinary Medicine, Alabama Polytechnic Institute, University

FLORIDA

Medical—Dr Edward Jelks, Box 1018, Jacksonville
Dental—Dr E C Lunsford, 126 W San Marius, Miami
Veterinary Medical—Dr J L Ruble, 1600 N Orange Ave., Orlando

GEORGIA

Medical—Dr Edgar H Greene, 478 Peachtree Street N E., Atlanta
Dental—Dr R H Murphy, 920 Persons Building, Macon
Veterinary Medical—Dr J M Sutton, Sylvester

LOUISIANA

Medical—Dr C Grenes Cole, 921 Canal Street, New Orleans
Dental—Dr Larry Dupuy, 837 Maison Blanche Building, New Orleans
Veterinary Medical—Dr E P Flower, Box 24, Baton Rouge

MISSISSIPPI

Medical—Dr T M Dye, Box 295, Clarksdale
Dental—Dr George P Evans, Standard Life Building, Jackson
Veterinary Medical—Dr E S Brashier, State Vet & Exec Off., Mississippi State Live Stock San Bd., Jackson

NORTH CAROLINA

Medical—Dr Hubert B Haywood, 127 W Hargett Street, Raleigh
Dental—Dr H O Lineberger, 804 Professional Building, Raleigh
Veterinary Medical—Dr William Moore, State Veterinarian, Raleigh

SOUTH CAROLINA

Medical—Dr W L Pressly, Due West
Dental—Dr E W Sheperd, Spartanburg
Veterinary Medical—Dr R A Mays, J C Calhoun State Office Building, Columbia

TENNESSEE

Medical—Dr W C Dixon, 706 Church Street, Nashville
Dental—Dr Lawrence T Kennedy, Medical Arts Building, Knoxville
Veterinary Medical—Dr M Jacob, University of Tennessee, Knoxville

FIFTH CORPS AREA

CORPS AREA COMMITTEE

Chairman—Dr E L Henderson, 606 S 4th Street, Louisville, Ky
Physicians—Dr Robert Conard, Hartman Theater Building, Columbus, Ohio, Dr Larue Carter, 1820 E 10th Street, Indianapolis
Dentists—Dr Earl D Lowry, 79 E State Street, Columbus, Ohio, Dr Wendell D Postle, 1714 N High Street, Columbus, Ohio
Veterinarian—Dr A F Schalk, Ohio State University, Columbus, Ohio
Hospital Representative—Dr Robert H Bishop, 2065 Adelbert Road, Cleveland
Medical Education Representative—Dr Hardy A Kemp, Ohio State University Medical School, Columbus, Ohio

STATE CHAIRMEN IN FIFTH CORPS AREA

INDIANA

Medical—Dr Charles R Bird, 23 E Ohio Street, Indianapolis
Dental—Dr H T Berkey, Wayne Pharmaceutical Building, Fort Wayne
Veterinary Medical—Dr Charles C Dobson, New Augusta

KENTUCKY

Medical—Dr Arthur T McCormack, 620 S 3d Street, Louisville
Dental—Dr E C Hume, Heyburn Building, Louisville
Veterinary Medical—Dr Arthur J Kay, 517 Murray Street, Frankfort

OHIO

Medical—Dr Robert Conard, Hartman Theater Building, Columbus
Dental—Dr Frank C Starr, 150 E Broad Street, Columbus
Veterinary Medical—Dr D C Hyde, 1700 Arlington Avenue, Columbus

WEST VIRGINIA

Medical—Dr R H Walker, 240 Capitol Street Charleston
Dental—Dr Ira J Kail, 1018 First National Bank Bldg., Huntington
Veterinary Medical—Dr H M Newton, P O Box 1721, Charleston

SIXTH CORPS AREA

CORPS AREA COMMITTEE

Chairman—Dr Charles H Phifer, 30 North Michigan Avenue, Chicago
Physicians—Dr P R Urmston, 916 Washington Avenue, Bay City, Mich., Dr Stephen E Gwin, 104 South Main Street, Fond du Lac, Wis
Dentists—Dr Leo Kremer, 55 East Washington Street, Chicago, Dr Paul H Jeserich, W K Kellogg Institute, Ann Arbor, Mich

Veterinarian—Dr Ward Giltner, Michigan State College, East Lansing, Mich

Hospital Representative—Mr Joseph G Norby, Columbia Hospital, Milwaukee

Medical Education Representative—Dr A C Bachmeyer, 950 East 59th Street, Chicago

STATE CHAIRMEN IN SIXTH CORPS AREA

ILLINOIS

Medical—Dr Harold M Camp, 2245 South Main Street, Monmouth
Dental—Dr William I McNeil, 59 East Madison Street, Chicago
Veterinary Medical—Dr A E Bott, 1317 Pennsylvania Ave., East St Louis

MICHIGAN

Medical—Dr P R Urmston, 916 Wash Avenue, Bay City.
Dental—Dr J O Goodsell, 2nd Nat Bank Building, Saginaw
Veterinary Medical—Dr B J Killham, Michigan State College, East Lansing

WISCONSIN

Medical—Dr R E Fitzgerald, 2750 North Teutonia Avenue, Milwaukee
Dental—Dr Charles Baumann, 408 West Greenfield Avenue, Milwaukee
Veterinary Medical—Dr W. Wisnicky, University of Wisconsin, Madison.

SEVENTH CORPS AREA

CORPS AREA COMMITTEE

Chairman—Dr Roy W Fouts, 107 South 17th Street, Omaha
Physicians—Dr F L Loveland, 109 West 9th Street, Topeka, Kan.; Dr Robert L Parker, 3510 6th Avenue, Des Moines, Iowa
Dentists—Dr F A Pierson, 1112 Federal Security Building, Lincoln, Neb., Dr A W. Bryan, Box 727, Iowa City
Veterinarian—Dr H D Bergman, Iowa State College, Ames, Iowa
Hospital Representative—Mr Robert E Neff, University Hospital, Iowa City
Medical Education Representative—Dr C W N Poynter, 42d Street and Dewey Avenue, Omaha

STATE CHAIRMEN IN SEVENTH CORPS AREA

ARKANSAS

Medical—Dr W R Brooksher, 602 Garrison Avenue, Fort Smith
Dental—Dr I M Sternberg, 1st National Bank Building, Fort Smith
Veterinary Medical—Dr Joe S Campbell, Route 4, Little Rock

IOWA

Medical—Dr T F Suchomel, 305 2d Street, Cedar Rapids
Dental—Dr John Voss, Voss Building, Iowa City
Veterinary Medical—Dr A R Menary, 1721 Blake Boulevard, Cedar Rapids

KANSAS

Medical—Dr F L Loveland, 109 West 9th Street, Topeka
Dental—Dr John W Richmond, Huron Building, Kansas City
Veterinary Medical—Dr R R Dykstra, Kansas State College, Manhattan

MINNESOTA

Medical—Dr William F Braasch, 102 2d Street, Rochester
Dental—Dr J P Werrick, Medical Arts Building, Minneapolis
Veterinary Medical—Dr C E Cotton, 3145 Portland Avenue, Minneapolis

MISSOURI

Medical—Dr Robert Mueller, 3115 South Grand Avenue, St Louis
Dental—Dr R J Rinehart, K C Western Dental College, Kansas City
Veterinary Medical—Dr S W Haigler, 7645 Delmar Boulevard, St Louis

NEBRASKA

Medical—Dr A A Conrad, Crete
Dental—Dr Lawrence A Donahoe, 1128 City National Bank Building, Omaha
Veterinary Medical—Dr W T Spencer, Livestock Exchange Building, Omaha

NORTH DAKOTA

Medical—Dr L W Larson, 221 5th Street, Bismarck
Dental—Dr A O Schjeldahl, 523½ 5th Avenue, Valley City
Veterinary Medical—Dr R E Shugley, 710 2d Street SE., Minot

SOUTH DAKOTA

Medical—Dr William Duncan, Webster
Dental—Dr R W Ellis, Salem
Veterinary Medical—Dr D L Cotton, Beresford

WYOMING

Medical—Dr George H Phelps, 1606 Capitol Avenue, Cheyenne
Dental—Dr L C Hunt, 308 West 3d Avenue, Cheyenne
Veterinary Medical—Dr H D Port, 304 Capitol Building, Cheyenne

EIGHTH CORPS AREA

CORPS AREA COMMITTEE

Chairman—Dr Sam E Thompson, Kerrville, Texas
Physicians—Dr Holman Taylor, 1404 West El Paso Street, Fort Worth, Texas, Dr John W Ames, 227 16th Street, Denver
Dentists—Dr T G Duckworth, 915 Medical Arts Building, San Antonio, Texas, Dr Fred C Elliott, 1018 Blodgett Avenue, Houston, Texas
Literarian—Dr M B Starnes, City Health Department, Dallas, Texas
Hospital Representative—Mr Frank Walter, St Luke's Hospital, Denver
Medical Education Representative—Dr Maurice H Rees, 4200 East 9th Avenue, Denver

STATE CHAIRMEN IN EIGHTH CORPS AREA

ARIZONA

Medical—Dr Charles S Smith, Nogales
Dental—Dr W A Baker, Professional Building, Phoenix
Veterinary Medical—Dr T B Jones, 105 Capitol Building, Phoenix

COLORADO

Medical—Dr John Ames, 227 16th Street, Denver
Dental—Dr E M Silverberg, 809 Republic Building, Denver
Veterinary Medical—Dr Floyd Cross, Colorado State College, Fort Collins

NEW MEXICO

Medical—Dr L B Cohenour, 221 Central Avenue Albuquerque
Dental—Dr H R Chapin, El Moro Building, Gallup
Veterinary Medical—Dr S W Wiest, Box 75, Santa Fe

OKLAHOMA

Medical—Dr Henry H Turner, 1200 North Walker, Oklahoma City
Dental—Dr A C Seeds, 1200 North Walker, Oklahoma City
Veterinary Medical—Dr L J Allen, 1610 North Ellison, Oklahoma City

TEXAS

Medical—Dr Holman Taylor, 1404 West El Paso Street, Fort Worth
Dental—Dr J E Robinson, Medical Arts Building, San Antonio
Veterinary Medical—Dr T O Booth, 2002 W T Waggoner Building, Fort Worth

NINTH CORPS AREA

CORPS AREA COMMITTEE

Chairman—Dr Charles A Dukes, 426 17th Street, Oakland, Calif
Physicians—Dr John H Fitzgibbon, 812 S W Washington, Portland, Ore, Dr John M O Shea, 422 Riverside Avenue, Spokane Wash
Dentists—Dr B C Kingsbury, 490 Post Street, San Francisco, Dr E O Slomira, 344 14th Street, San Francisco
Literarian—Dr C M Haring University of California, Berkeley, Calif
Hospital Representative—Dr Benjamin W Black, 2701 14th Avenue, Oakland, Calif
Medical Education Representative—Dr Loren R Chandler, Stanford University, School of Medicine, San Francisco

STATE CHAIRMEN IN NINTH CORPS AREA

CALIFORNIA

Medical—Dr Harold A Fletcher, 490 Post Street, San Francisco
Dental—Dr Kenneth Ruedy, 3780 Wilshire Boulevard Los Angeles, Dr John W Leggett, 490 Post Street, San Francisco
Literarian Medical—Dr Joseph M Arburua, 26 Fell Street, San Francisco

IDAHO

Medical—Dr F M Cole, Caldwell
Dental—Dr J E Bennett, Idaho Falls
Literarian Medical—Dr Arthur P Schneider, 2519 Boise Ave., Boise

MONTANA

Medical—Dr Herbert Caraway, 115 North 28th Street, Billings
Dental—Dr D H McCuley, 9 First Avenue, Laurel
Literarian Medical—Dr W J Butler, c/o Capitol Station, Helena

NEVADA

Medical—Dr C W West, 120 North Virginia Street, Reno
Dental—Dr G C Steinmiller, Masonic Temple, Reno
Veterinary Medical—Dr. Edward Records, University of Nevada, Reno

OREGON

Medical—Dr Wilson Johnston, 1020 S W Taylor Street, Portland
Dental—Dr N L Zimmerman, Medical Dental Building, Portland
Veterinary Medical—Dr Fred W Lange, 855 Belmont Street, Salem

UTAH

Medical—Dr John F Sharp, 75 S Main, Salt Lake City
Dental—Dr C O Robinson, Medical Arts Building, Salt Lake City
Veterinary Medical—Dr W H Hendricks, 1419 East 17th South Street, Salt Lake City

WASHINGTON

Medical—Dr Raymond Zech, 509 Olive Way, Seattle
Dental—Dr L L Foote, Medical & Dental Building, Seattle
Veterinary Medical—Dr M O Barnes, 203 Federal Building, Olympia

APPENDIX 3—ADDRESSES OF NAVAL
COMMANDANTS

The addresses of commandants of the several naval districts and the limits of their jurisdiction as far as Naval Reserve is concerned are

Commandant, 1st Naval District, North Station Office Building, 150 Causeway Street, Boston (States of Maine, Massachusetts, New Hampshire, Vermont, and Rhode Island including Block Island)

Commandant, 3d Naval District, Federal Building, 90 Church Street, New York (States of New York, Connecticut, and upper New Jersey, including counties of Mercer, Monmouth, and all counties north thereof, also Nantucket Shoals Lightship)

Commandant, 4th Naval District, Navy Yard, Philadelphia (States of Pennsylvania, southern part of New Jersey, including counties of Burlington, Ocean, and all counties south thereof, Delaware, including Winters Quarter Shoal Light Vessel)

Commandant, 5th Naval District, Naval Operating Base, Norfolk, Va (States of Maryland, except Prince Georges, Montgomery, and Charles Counties, Virginia, except Arlington, Fairfax, Stafford, King George, and Prince William Counties, and the city of Alexandria, West Virginia and the counties of Currituck, Camden, Pasquotank, Gates, Perquimans, Chowan, Dare, Tyrrell, Washington, Hyde, Beaufort, Pamlico, Craven, Jones, Carteret and Onslow in North Carolina, also the Diamond Shoal Lightship)

Commandant, 6th Naval District, Navy Yard Charleston, S C (States of South Carolina, Georgia, and North Carolina, except the counties of Currituck, Camden, Pasquotank, Gates, Perquimans, Chowan, Dare, Tyrrell, Washington, Hyde, Beaufort, Pamlico, Craven, Jones, Carteret and Onslow)

Commandant, 7th Naval District, Naval Station, Key West, Fla (State of Florida, except counties west of Apalachicola River)

Commandant, 8th Naval District, Federal Building, New Orleans, La (States of Alabama, Tennessee, Louisiana, Mississippi, Arkansas, Oklahoma, Texas, and Florida, except counties east of Apalachicola River)

Commandant, 9th Naval District, Naval Training Station, Great Lakes Ill (States of Ohio Michigan, Kentucky, Indiana, Illinois, Wisconsin, Minnesota, Iowa, Missouri, North Dakota, South Dakota, Nebraska, and Kansas)

Commandant, 10th Naval District, San Juan, P R (All island possessions of the United States pertaining to Puerto Rico and the Virgin Islands)

Commandant, 11th Naval District, Naval Operating Base San Diego Calif (States of New Mexico, Arizona southern part of California including counties of Santa Barbara Kern, and San Bernardino and all counties south thereof)

Commandant, 12th Naval District, 1095 Market Street, San Francisco, Calif (States of Colorado, Utah, Nevada, northern part of California including counties of San Luis Obispo Kings, Inyo and Tulare and all counties north thereof)

Commandant, 13th Naval District, Exchange Building, Seattle, Wash (States of Washington, Oregon, Idaho, Montana, Wyoming, and Territory of Alaska)

Commandant, 14th Naval District, Navy Yard Pearl Harbor, T H (Hawaiian Island and islands westward, including Midway)

Commandant, 15th Naval District, Naval Station, Balboa C Z (Panama Canal Zone)

Commandant, 16th Naval District, Naval Station, Cavite, P I (Philippine Islands)

Commandant, Navy Yard, Washington, D C (District of Columbia, Prince Georges, Montgomery, and Charles Counties Maryland, and Arlington Fairfax, Stafford King George, and Prince William Counties Virginia and the city of Alexandria, Va)

PHYSICIANS WANTED FOR BLOOD DONOR SERVICES

The Red Cross Blood Donor Service, collecting blood for the Army, Navy and civilian defense, requires for its expanded program about twenty more physicians to be in charge of blood procurement teams. Both men and women are acceptable. Those with recent hospital experience with blood transfusions are preferred. These physicians are employed on a full time basis and work under the direction of the technical supervisor of each center appointed by the National Research Council. Application should be made by writing to the technical supervisor of the nearest blood donor center, giving medical school, year of graduation, age, sex, hospital experience, status relative to military service and other facts that may have bearing on the applicant's qualifications. Application may be made to the following:

Dr. Sidney O. Levinson, Samuel Deutsche Convalescent Serum Center, 2912 Ellis Avenue, Chicago
Dr. Paul W. Searles, Buffalo General Hospital, Buffalo
Dr. Warren Cooksey, 62 Kirby Avenue, West, Detroit
Dr. Paul I. Hoxworth, Cincinnati General Hospital, Cincinnati.
Dr. C. M. Hyland, 4524 Sunset Boulevard, Los Angeles.
Dr. Carl W. Walter, Harvard Medical School, Boston.
Dr. John R. Upton, San Francisco County Medical Society, 2180 Washington Street, San Francisco
Dr. Maurice Hardgrove, Columbia Hospital, Milwaukee.
Dr. Frank H. Evans, 121 University Place, Pittsburgh.
Dr. Warfield M. Firor, Johns Hopkins Hospital, Baltimore.
Dr. Aims C. McGuinness, Children's Hospital, Philadelphia.
Dr. Carl Lenhart, 2065 Adelbert Road, Cleveland.
Dr. Clyde G. Culbertson, Indiana University Medical School, Indianapolis
Dr. Earl S. Taylor, Box 200, Presbyterian Hospital, New York.
Dr. Carl V. Moore, Blood Donor Service, St. Louis Chapter ARC, 1007 Olive Street, St. Louis.
Dr. Earle Mahoney, Strong Memorial Hospital, 260 Crittendon Boulevard, Rochester, N. Y.

It is the policy of the directing board of the Procurement and Assignment Service that these positions be filled by men over the age of 45, or those under 45 who are physically disqualified for military service, and that women physicians be employed wherever possible. This is necessary in order that the Procurement and Assignment Service may not be required to request these men for military service should the need become acute.

It is the sense of the directing board that when these positions can be filled by men over 45 the board should not be asked to seek permanent deferment from the provisions of the Selective Service acts for those men under 45 who are physically qualified for military service.

COURSE FOR AVIATION MEDICAL EXAMINERS

A routine course of instruction to qualify medical officers for duty as aviation medical examiners began at the School of Aviation Medicine, Randolph Field, Texas, on January 5. The course will continue for three months. The names of the officers enrolled, together with the stations to which they are assigned, follows:

ADAMS, John M., Captain, Fort Lewis, Wash.
AGIN, Lambert J., 1st Lieut., Selfridge Field, Mich.
AKRE, Osmond H., 1st Lieut., McChord Field, Wash.
ALEXANDER, Martin M., 1st Lieut., Floyd Bennett Field, N. Y.
ALLISON, Olaf W., 1st Lieut., A. C. B. F. S., Enid, Okla.
ANDERSON, Robert C., Captain, Randolph Field, Texas
ANSPACH, Royal S., Major, Camp Claiborne, La.
BACKER, Max B., 1st Lieut., Langley Field, Va.
BARKER, John D., 1st Lieut., Portland Air Base, Portland, Ore.
BERGENER, Karl L., 1st Lieut., Fort Huachuca, Ariz.
BESS, George C., Captain, Fort Lewis, Wash.
BEST, Marshall M., Captain, Fort Bragg, N. C.
BLALOCK, John T., Jr., 1st Lieut., Camp Wheeler, Ga.
BLOCK, Richard M., 1st Lieut., Fort Bragg, N. C.
BODEN, Herbert N., 1st Lieut., Fresno Air Base, Fresno, Calif.
BRASELTON, Charles W., Jr., 1st Lieut., Fort Bliss, Texas
CAMPBELL, George M., 1st Lieut., Randolph Field, Texas
CAMPBELL, Kenneth D., 1st Lieut., Manchester Air Base, Manchester, N. H.
CAMPBELL, William J., 1st Lieut., Fort Sam Houston, Texas
CARTER, William H., 1st Lieut., Sheppard Field, Texas.
CLEARY, Frank, 1st Lieut., Hamilton Field, Calif.
CORO, Roberto Covas J., Lieut. Dr., Cuban Army Reserve, Air Corps.
CRAGO, Felix H., Captain, Fort Lewis, Wash.

DAVIS, William, 1st Lieut., 44th Division, Fort Dix, N. J.
DEVEREUX, James A., Captain, A. C. B. F. S. No. 7, Hgley, Ariz.
DIXON, John R., 1st Lieut., Ellington Field, Texas
DOW, Charles H., 1st Lieut., Fort George G. Meade, Md.
ELLIOTT, Grant R., Major, Savannah Air Base, Savannah, Ga.
FIALLOS, Juan Manuel, Major, Honduran Army.
FIXOTT, Richard S., Captain, Fort Lewis, Wash.
FORD, Sylvester C., 1st Lieut., West Virginia Induction Station, Huntington, W. Va.
GADDIS, Herman W., Captain, Fort Sam Houston, Texas.
GANS, Edward W., 1st Lieut., Stockton Field, Calif.
GUILFORD, Frederick R., 1st Lieut., Ellington Field, Texas.
HARTNETT, Dalton C., 1st Lieut., Fort Sam Houston, Texas.
HARVEY, Arch D., 1st Lieut., Pittersfield Field, Fairfield, Ohio.
HAW, Marvin T., Jr., Captain, Air Base, Fresno, Calif.
HECKER, Robert C., Captain, Fort Meade, Md.
HEFFNER, Edward A., Captain, Camp Bowie, Texas.
HELLMANN, Robert S., Captain, Tyndall Field, Fla.
HENRY, Joseph R., 1st Lieut., Chanute Field, Ill.
HINN, George J., 1st Lieut., Muroc Bombing and Gunnery Range, Muroc, Calif.
HOPSON, George, 1st Lieut., Geiger Field, Wash.
HOWERTON, Ernest E., Captain, Camp Bowie, Texas.
HUBBARD, Oscar E., Captain, Fort Bragg, N. C.
HUDSON, Lawrence B., Captain, Camp Blanding, Fla.
HYLAN, Nathan W., 1st Lieut., Fort Williams, Maine.
JACKSON, William M., Captain, Fort Bragg, N. C.
JORDAN, Ralph E., 1st Lieut., Moffett Field, Calif.
KAPLAN, Hyman J., Captain, Kelly Field, Texas.
KELSEY, Mavis P., 1st Lieut., Portland Air Base, Portland, Ore.
KNAUF, George M., 1st Lieut., A. C. T. D., Rising Sun School of Aeronautics, Philadelphia
LAMB, Roland D., Captain, Camp Blanding, Fla.
LAYDON, Milton, 1st Lieut., Recruiting and Induction Service, San Francisco
LOUGHRAN, Fred J., 1st Lieut., Windsor Locks Air Base, Windsor Locks, Conn.
MACMILL, Arthur E., 1st Lieut., Gowon Field, Boise, Idaho.
MAGNESS, Stephen L., 1st Lieut., Fort George G. Meade, Md.
MANNING, John J., 1st Lieut., Mather Field, Calif.
MANTZ, Harry E., 1st Lieut., Maxwell Field, Ala.
MARDER, Samuel H., 1st Lieut., Maxwell Field, Ala.
MERRIMAN, George J., Jr., 1st Lieut., Brooks Field, Texas.
MICKAL, Abe, 1st Lieut., Fort Bragg, N. C.
MORAN, John A., 1st Lieut., Langley Field, Va.
MUELLER, Paul F., 1st Lieut., Drew Field, Fla.
MUNAL, Harold D., 1st Lieut., A. C. B. F. S., Bakersfield, Calif.
NELSON, Irving, 1st Lieut., Jackson Air Base, Jackson, Miss.
NEWELL, Robert H., 1st Lieut., Scott Field, Ill.
NUERNBERGER, Robert E., 1st Lieut., Camp Barkeley, Texas.
OETJEN, Leroy H., Captain, MacDill Field, Fla.
OLIVER, Ernest B., 1st Lieut., Camp Shelby, Miss.
OWERS, Albert 1st Lieut., Camp Wolters, Texas
PAINE, Wilmer H., Captain, 47th Field Artillery, Fort Bragg, N. C.
PERRY, Alvin L., 1st Lieut., William Beaumont Hospital, El Paso, Texas.
PINGER, Robert R., 1st Lieut., Pendleton Air Base, Pendleton, Ore.
RANDALL, Ross G., 1st Lieut., Paine Field, Everett, Wash.
REEH, Merrill J., Captain, Randolph Field, Texas
REINUS, Francis Z., 1st Lieut., Daniel Field, Augusta, Ga.
RICE, Dale A., 1st Lieut., Office Chief of Air Corps, Washington, D. C.
ROBINSON, Howard, Captain, 29th Infantry, Fort Benning, Ga.
ROBINSON, Leo D., 1st Lieut., McChord Field, Wash.
ROSE, Frederick A., 1st Lieut., Paine Field, Everett, Wash.
ROY, Joseph L., Captain, Camp Edwards, Mass.
RUSSELL, Ralph E., Captain, 207 General Hospital, Camp Livingston, La.
RYTERBAND, Louis, 1st Lieut., Jackson Air Base, Jackson, Miss.
SCHUMACHER, Edward R., 1st Lieut., Charlotte Army Air Base, Charlotte, N. C.
SHAW, Jesse W., 1st Lieut., Will Rogers Field, Okla.
SHEPPERD, Lewis A., 1st Lieut., Kelly Field, Texas.
SHULLER, Thurman, 1st Lieut., Air Corps Gunnery School, Las Vegas, Nev.
SIMPSON, Robert C., Captain, 99th Field Artillery, Edgewood Arsenal, Md.
SMITH, Thomas W., 1st Lieut., Fort Hancock, N. J.
SOSSON, Edward, 1st Lieut., Will Rogers Field, Okla.
SPINELLI, Vincent A., 1st Lieut., Westover Field, Mass.
STANSBURY, Frederick C., 1st Lieut., Fort Bragg, N. C.
STUTTON, James A., 1st Lieut., Keesler Field, Miss.
TALBOTT, Charles H., 1st Lieut., 213th General Hospital, Camp Bowie, Texas
TEAL, Ralph C., Captain, McClellan Field, Calif.
WALDORF, Frank B., 1st Lieut., Mitchel Field, N. Y.
WALLACE, Warren S., 1st Lieut., Langley Field, Va.
WASHBURN, William W., Captain, Camp Blanding, Fla.
WATSON, James R., Jr., Captain, Camp Livingston, La.
WEINSTEIN, Roy C., 1st Lieut., Muroc Bombing and Gunnery Range, Muroc, Calif.
WEISBERG, Raphael J., 1st Lieut., Langley Field, Va.
WOODALL, Paul S., Captain, Orlando Air Base, Orlando, Fla.
WOODWORTH, John A., 1st Lieut., Mitchel Field, N. Y.
YOUNG, Leslie W., 1st Lieut., Selfridge Field, Mich.
ZAMPETTI, Herman A., Captain, Fort Logan, Colo.
ZEITHAML, Carl E., 1st Lieut., Paine Field, Everett, Wash.

CIVILIAN DEFENSE PLANS IN NEW YORK CITY

In reporting on the civilian defense program for New York City, Mayor LaGuardia is reported to have said, January 18, that the city has been divided into seven medical control districts, under the supervision of Dr. Edward M. Bernicker, chief of the emergency medical service. The borough chiefs, their control stations and the number of report centers under their command are as follows:

Manhattan—Dr. Condict W. Cutler Jr., East Division: Firehouse, 157 East Sixty-Seventh Street; fourteen report centers. West Division: Police station, 306 West Fifty-Fourth Street; thirteen report centers.

Brooklyn—Dr. Thomas A. McGoldrick. East Division: Police station, 421 Empire Boulevard; seventeen report centers. West Division: Power plant, Sixth Avenue and Bergen Street; thirteen report centers.

Bronx—Dr. Edward R. Cuniffe, power plant, 1925 Bathgate Avenue; eleven report centers.

Queens—Dr. Harry P. Mencken, Queens Police Headquarters, 168th Street and Ninety-First Avenue, Jamaica; fourteen report centers.

Richmond—Dr. Herbert A. Cochrane, auxiliary power station, 78-82 Richmond Terrace, St. George; three report centers.

According to the *New York Times*, Mayor LaGuardia said that the following projects and training programs already had been instituted by the Emergency Medical Service:

"1. Field units at eighty hospitals, comprising 204 day and night squads, 716 medical teams with a total personnel of 2,140 resident doctors, nurses and volunteer nurses' aides. A medical team normally consists of a doctor, a nurse and a nurse's aide.

"2. Selected 5,248 casualty stations throughout the city in or immediately adjacent to every important industrial, commercial and residential center.

"3. Set up medical depots for the storage of reserve supplies of stretchers, blankets, collapsible cots, serum, blood banks and splints.

"4. Training schools for volunteer nurses' aides at fifty-two hospitals to provide ten thousand trained women to supplement regular nurses on duty in hospital wards, field service, clinics, school and public health stations.

"5. Drafted plans for the evacuation of chronic patients to the hospitals outside the city and designated key hospitals in certain areas as casualty hospitals for the mass handling of critically injured.

"The eighty hospitals which have medical field units, drilled, equipped and ready for duty anywhere in their districts at any hour of the day or night, are spread about the five boroughs in this way:

	Hospitals	Squads	Resident Personnel
Manhattan	37	168	1,096
Bronx	7	22	240
Brooklyn	21	46	464
Queens	9	19	174
Richmond	6	15	150

"Each squad is made up of doctors, nurses, nurses' aides and orderlies, varying in size from two each in the smaller hospitals to four and six each in the larger institutions. Each squad will have its own leader and transportation in the form of one or two ambulances, trucks and station wagons."

The American Red Cross and other volunteer agencies are instructing two hundred thousand air raid wardens and twenty-four thousand auxiliary firemen in first aid. The emergency medical service has organized ready for this service eleven thousand physicians, fifteen thousand hospital nurses, ten thousand graduate nurses in private practice and one thousand private and public ambulances. There is still need, the mayor said, for five thousand women to take the nurses' aid training program to fit themselves to supplement the work of graduate nurses.

HOSPITAL UNITS ORDERED TO ACTIVE SERVICE

The Second, Twelfth and Twenty-Sixth U. S. Army General Hospital units and the Seventy-Third Evacuation Hospital unit have been activated and ordered into military service. The Second General Hospital unit, under the command of Col. Paul M. Crawford, M. C., enters active service from the Presbyterian Hospital, New York City, and has been ordered to Fort Meade, Md., for training. The Twelfth General Hospital unit from Northwestern University, Chicago, commanded by Col. John H. Sturgeon, M. C., has been ordered to Fort Custer, Mich., and the Twenty-Sixth General Hospital unit, under the command of Lieut. Col. Floyd V. Kilgore, M. C., has been ordered to Fort Snelling, Minn. The Seventy-Third Evacuation Hospital unit, Los Angeles County Hospital, Calif., under the command of Lieut. Col. Oral B. Bolibaugh, M. C., will train at Camp San Luis Obispo, Calif.

ARMY RESERVE OFFICERS ORDERED TO ACTIVE DUTY NINTH CORPS AREA

The following additional medical reserve corps officers have been ordered to extended active duty by the Commanding General, Ninth Corps Area, which comprises the states of Washington, Montana, Oregon, Nevada, Utah, California and Idaho:

ABBETT, Arthur L., 1st Lieut., Oakland, Calif., Fort Winfield Scott, Calif.
ADAMS, Burton E. E., 1st Lieut., San Diego, Calif., 1st Medical Regiment, Fort Ord, Calif.
BAILEY, Nicholas E., 1st Lieut., Manhattan Beach, Calif., Camp Callan, Calif.
BAIRD, Charles G., Colonel, Santa Maria, Calif., Camp Cooke, Calif.
BANKS, Harry B., 1st Lieut., San Francisco, Fort Winfield Scott, Calif.
BESECKER, Lester D., Captain, Porthill, Idaho, Fort Lewis, Wash.
BRIGGS, John D., 1st Lieut., Weaverville, Calif., 2d Battalion 58th Quartermaster Regiment, Stockton, Calif.
BURSTON, Herschel H., 1st Lieut., Los Angeles, 7th Division, Fort Ord, Calif.
CLARY, Raimond F., 1st Lieut., Santa Rosa, Calif., Fort McDowell, Calif.
COHN, Herbert J., Lieut. Colonel, San Francisco, Camp San Luis Obispo, Calif.
EVERINGHAM, Sumner, Lieut. Colonel, Oakland, Calif., Fort Ord, Calif.
FREDERICKSON, Clyde H., Lieut. Colonel, Missoula, Mont., Fort Lewis, Wash.

FRIEDMAN, Meyer, 1st Lieut., San Francisco, Fort Winfield Scott, Calif.
GATES, Francis K., Captain, El Monte, Calif., Camp Roberts, Calif.
GREENMAN, Robert A., 1st Lieut., Westwood, Calif., Camp Lockett, Calif.
ISHIKAWA, Tokio, 1st Lieut., San Jose, Calif., Camp Grant, Ill.
JORDAN, Philip J., 1st Lieut., San Jose, Calif., Camp San Luis Obispo, Calif.
KAHN, Harold, 1st Lieut., Redding, Calif., Fort MacArthur, Calif.
LEVITIN, Joseph, Major, San Francisco, Recruiting Office, San Francisco.
McCUSKEY, Charles F., Major, Glendale, Calif., Camp Haan, Calif.
MISSALL, Albert S., 1st Lieut., Santa Maria, Calif., Camp Cooke, Calif.
MORGAN, John D., Lieut. Colonel, Fresno, Calif., Fort Ord, Calif.
MURPHY, Paul L., 1st Lieut., Hanford, Calif., Camp Roberts, Calif.
NORQUIST, Donald M., 1st Lieut., Los Angeles, Fort Lewis, Wash.
OLSON, Frederick A., 1st Lieut., Fortuna, Calif., Fort Ord, Calif.
PEARSON, John A., 1st Lieut., Livingston, Mont., 53d Infantry, Sacramento, Calif.
PRITCHARD, Jacob L., Lieut. Colonel, San Jose, Calif., Fort Winfield Scott, Calif.
SPALDING, William C., Major, Los Angeles, Fort Rosecrans, Calif.
WEISS, Isidore I., 1st Lieut., Stockton State Hospital, Calif., Camp Roberts, Calif.

Relieved from Active Duty

PAUL, Norman W., 1st Lieut., North West Air District, Fort George Wright, Wash.
WILCOX, Charles F., Major.

ORGANIZATION SECTION

OFFICIAL NOTES

ANNUAL CONGRESS ON INDUSTRIAL HEALTH

Fourth Annual Meeting, held in Chicago, Jan. 12-14, 1942

DR. STANLEY J. SEEGER, Milwaukee, in the Chair

JANUARY 12—MORNING

Report of the Council on Industrial Health

DR. STANLEY J. SEEGER, Milwaukee: The industrial worker has been given a place of special prominence in the prosecution of war efforts. Loss of working time by skilled and indispensable workers, no matter what the cause, must be classed today as casualties. The necessity for the coordination of effort of various agencies interested in the health and medical care of the defense worker has been generally admitted and real progress has been made.

A meeting of the Subcommittee on Industrial Health and Medicine of the Federal Security Agency and the Council on Industrial Health of the American Medical Association was held late in January 1941. At this time a committee of the Council was appointed to act with the subcommittee to formulate a statement covering industrial hygiene needs of the national defense. These recommendations were endorsed by the Health and Medical Committee, and proposals with reference to the expansion of the Division of Industrial Hygiene of the Public Health Service were promptly put into effect. Funds for special researches were made available to the Health and Medical Committee, and specific projects have been prepared and investigative work has been prosecuted. It is important to emphasize the fact that the proposed program specifically recommends that the Division of Industrial Hygiene of the National Institute of Health should develop, in cooperation with the state authorities and the committees on industrial health of the state medical societies, a definite program of instruction designed to acquaint the practicing medical profession with the fundamentals of industrial medicine and designed to carry into effect the minimum standards set up to protect the health of employees. The subcommittee has pursued its duties in three main channels: (1) industrial hygiene, (2) the physician in industry and (3) the general physician who serves occasionally in industry. Since the first congress in 1939 the Council has stressed the importance of the care of workers in small industries, in which it is estimated that 85 per cent of industrial workers are employed. It is the general belief that the hazards of industrial poisons are present chiefly in the large companies and seldom in the small ones. There is, however, good reason to believe that the individual worker in the small plant is exposed to more hazards or to the same hazards in more ways than the man in the large plant.

The difficulties of attempting to establish industrial health programs in small plants are characteristic of the manner in which science has outstripped the advancement of social and professional organization which would make possible the fullest utilization of our knowledge.

The Council has developed during the past year committees in the various scientific sections of the American Medical Association whose specific purpose it is to work with the Council in this field. The scientific sections of the Association are great reservoirs of authoritative information and will serve as sources of sound advice in special problems. The presentations at this meeting from the Section on Ophthalmology and the Section on Dermatology and Syphilology, as well as the joint report of the Council on Foods and Nutrition and the Council on Industrial Health on the problems of vitamin

administration in industry, illustrate the possibilities of coordination of effort in an association as vast as this.

In cooperation with the Subcommittee on Industrial Health and Medicine, the secretary of the Council has carried out a program listing the qualifications and availability for service of physicians in industry. In reviewing the field of industrial health one is impressed by its importance and by the desirability of stimulating well trained men in adopting this field as a career. With the exception of relatively few well organized medical departments, at the present time industry does not offer to the medical man the opportunities which are afforded to men in other professions. It is hoped that industry, both large and small, can be made to see the advantage of developing medical programs which will provide careers of professional attainment with definite objectives and satisfactory compensation so that industrial workers may be provided with a uniformly high quality of medical service.

Medical Aspects of Vocational and Industrial Training

DR. W. A. SAWYER, Rochester, N. Y.: The national defense program has demonstrated the need for serious consideration of the physical condition of our man power. In realization of this fact, a health project was set up in Rochester, N. Y., for the trainees attending vocational classes for war industries conducted by the Rochester Board of Education. The Rochester Health Bureau, the Monroe County Medical Society and the local Tuberculosis and Health Association have worked closely with the Education Vocational Training Service of the Board of Education. The federal government has provided funds for medical examinations under the provisions of the Emergency Defense Training Act and out of funds assigned to vocational education for national defense. The project includes medical examinations and follow-up of the physically disqualified in an effort to correct defects. The physical qualifications necessary to be an industrial worker are less exacting than those demanded for military service. Industry can use many men who are physically limited. The trainee therefore receives a complete physical examination of the type given at industrial plants. His physical condition and defects are noted on a special record card, with a separate blank for past medical history. In addition to the general check-up, the examination includes a urine examination, a tuberculin skin test and a Wassermann test. All persons who react positively to the tuberculin skin test are urged to have a roentgenogram of the chest at the county sanatorium. All but 10 per cent have done so.

Following the medical examination, a preliminary rating is made in accordance with the following standards:

- I. In good physical condition—fit for any job.
- II. Having minor physical defects—fit for most jobs.
- III. Having major physical defects or conditions needing correction.
- IV. Having a disqualifying defect or physical condition which would be hazardous to the man or make it impossible for him to succeed at the job.

At the time of the examination, the physician discusses the findings with the trainee and urges him to seek medical counsel, if needed. When completed by the addition of the laboratory findings, the medical record is referred to a rating committee. As this record is regarded as confidential, the board of education and the state employment service, now the Federal Employment Service, are advised only of the health rating. Men with a III or IV rating receive the following communication from the Board of Education:

A review of your medical examination record shows that you have certain physical defects or conditions needing correction. A report of your health rating has been made to the New York State (now Federal)

Employment Service, which will find it difficult to assist you in obtaining employment until you meet minimum industrial health standards. You are urged to consult your own physician and dentist. If you are financially unable to obtain private medical care and wish to secure the advice of the medical consultant of the Tuberculosis and Health Association, we suggest that you call at the association.

At the same time that he is notified of his rating, the trainee is urged to visit the Tuberculosis and Health Association office. If he does so, the refer clerk takes him, with his record, to the office of the medical consultant located in the same building. There the record is reviewed and the noted defects are rechecked with the objective of qualifying the trainee as soon as possible for employment "specifically cited." Arrangements for necessary treatment are made through existing community facilities, as under no circumstances does the medical consultant give treatment or the nurses make home visits for treatment purposes. Clinics and hospitals, as well as private physicians, are most cooperative in this respect. If, however, it is impossible to obtain corrective treatment, the medical consultant suggests the type of work the trainee is capable of doing. Fitting the man for the job he is physically qualified to fill is the most significant feature of the project. An effort is made to bring a health education message through sound motion pictures to every trainee before he is examined. In addition, literature on the subjects of healthful living, care of the eyes, nutrition, tuberculosis, syphilis and gonorrhea is distributed, and a large part of the nurses' time is spent explaining good health practices. A review of 2,791 records showed that about 33 per cent were disqualified for defense industry employment unless defects were corrected. Of those disqualified, 60 per cent voluntarily sought the Medical Consultant Service of the Tuberculosis and Health Association. Of the 547 men in classes III and IV who saw the consultant, 85 per cent had conditions sufficiently corrected to be given jobs. Of the 110 men found to have definite near vision defects, 84 per cent secured glasses to correct the vision defects and were approved for employment. It was found impossible to make any more than emergency provision for dental repair. All the men found to have cardiovascular disease, diabetes, kidney disease and other chronic diseases were referred to clinics or private physicians, who were requested to give reports of present status to the employment agency. Thirty-three men were referred for surgical treatment of hernia. All having varicose veins were approved for employment after reexamination. The 32 trainees having positive Wassermann tests satisfied health bureau authorities that they would continue under treatment and were subsequently approved for employment with one exception. Arrangements were made to give smallpox vaccinations to men with no vaccination scar. Nine hundred and twenty-eight (33 per cent) were found to have positive tuberculin skin tests and were referred for chest x-ray examination. Seventeen cases of tuberculosis were discovered, 6 of which were active. Of the 514 men seen by the medical consultant, 438 were found to be employable, some in selected jobs. In the rehabilitation program, effort was concentrated on the correction of major defects or conditions.

Sixty-four physicians participated in the physical examinations, assisted by two nurses (full time) and eight nurses (part time, during clinic sessions only). Physicians received \$2 for each examination, nurses \$1 an hour. The total expenditure to date for these services has been \$7,897. Preenrollment examinations have not been possible. Examinations during training had certain advantages. The men did not feel they were being rejected before they had been given a chance to demonstrate what they could do. It removed the opprobrium that physical examinations do not give a chance in borderline cases. In some instances, final decision as to a man's workability was a combination of physical examination and trial in certain jobs while training.

This program can be undertaken by any community if the various agencies will cooperate. It is one way of offering pre-placement medical examinations to small industries. A majority of applicants for work in the younger age groups can easily be persuaded to take advantage of community facilities for the correction of physical defects.

The Physiology of Work

DR. A. C. IVY, Chicago: This article appears in full in this issue, page 569.

A Symposium on Tuberculosis in Industry Held at the Saranac Laboratory, Saranac Lake, N. Y., in June 1941: A Résumé

DR. LEROY U. GARDNER, Saranac Lake, N. Y.: This program was arranged to clarify concepts of tuberculosis and to define the influence of factors peculiar to industry that may affect this infection. Dr. Dublin and Dr. Gafafer presented data on the incidence and trends of tuberculosis in different industrial groups. In 1911 this disease was the first cause of death among wage earners, accounting for 20 per cent of their mortality; today it is sixth in importance and responsible for 6.5 per cent of their deaths. Its prevalence in any community is determined by the general standard of living and by the number of open carriers. In particular occupations the factors of selective employment and unfavorable environment modify the picture. If such factors are dominant the incidence in the wage earners will be different from that in their families. The effects of an outstanding factor such as silica are manifest in all tables comparing tuberculosis mortality in different occupations. Of twenty British industries with the highest mortality from tuberculosis, thirteen involve exposure to silica dust; of the corresponding twenty in this country, only six fall in the same category. A pertinent fact brought out by Dr. Dublin is the shift of peak mortality to higher age levels during the past fourteen years.

It is accepted that the source of the great bulk of infections is a human carrier with a pulmonary cavity. From the public health standpoint the objective is early detection of these carriers, segregation and closure of their cavities. Discussion disclosed a lack of reliable information on the effectiveness of artificial pneumothorax in rendering the sputum negative for tubercle bacilli. In Trudeau Sanatorium this form of treatment has effected conversion in only about 30 per cent of the cases tried.

While the home is probably the place of most childhood and some adult contacts, many primary and more reinfections must occur in the place of work. Nurses, physicians and attendants on the sick encounter a real occupational hazard from infection itself. It was Dr. Amberson's belief that they should accept this hazard as incidental to their professional life and that hospital management on its part should assume the obligation of minimizing opportunities for mass infection.

The influence of first infections was debated, some holding that they were responsible for both positive tuberculin reactions and relative immunity to reinfection. Dr. Amberson felt that the frequency of significant reinfections is about as great in positive as in negative reactors.

Dr. Johnston referred to a demonstration of the possibility of endogenous reinfection in adolescents. A group of children whose contact with tuberculous parents had produced positive tuberculin reactions but no x-ray evidence of reinfection were removed to foster homes. There, without further known exposure, they later developed clinically significant tuberculosis. The question of the frequency of reinfection at different age periods is extremely important to the public health official. Evidence from many surveys indicated that both old and clinically significant tuberculosis can be found at any age. Most of the material seemed to suggest that the frequency of old tuberculosis increases progressively with age. But even in the sixth and seventh decades there is today plenty of tuberculosis that needs treatment. Opinions differed on the source of such infections. Many felt that most of this old age disease represents carry-overs in resistant hosts of infections acquired when tuberculosis was more prevalent than now. Dr. Sander presented convincing evidence from his experience with eight annual examinations on a group of seven thousand industrial workers.

Mr. Cummings concluded that new infections must be constantly acquired from external sources and based his opinion on the progressive increase in their incidence in successive age periods.

Dr. Fellows agreed that repeated reexamination is essential if tuberculosis is to be controlled. His experience of thirteen years has demonstrated new infections at all ages among the fourteen thousand employees in the home office of the Metro-

politan Life Insurance Company. The number of such cases has steadily declined from 56 in 1928 to 13 in 1940. Sometimes extensive shadows develop within a few weeks after a negative film. It seemed to be the consensus that reinfection is possible at any age, that it is most common before ages 30 to 40 and that, for new disease to develop in the elderly, repeated contact with a carrier is essential. Recognized symptoms may or may not be associated with these x-ray manifestations of new disease.

The factors which determine whether healing will occur were our chief concern. Sex becomes important when one reflects that 65 per cent more young women than men die of tuberculosis between ages 15 and 25. Dr. Johnston's evidence indicated the probability that the unfavorable course of the infection at the onset of menstruation could be correlated with chemical disturbances in body metabolism. From a practical standpoint the employer of large numbers of women needs an effective medical department if he would avoid a tuberculosis problem.

Certain races must have acquired some immunity, transmitted by the generations of ancestors who have survived the ravages of tuberculosis. This factor was so intricately associated with the effects of living standards and environment, particularly after migration into a new country, that its effects could not be weighed.

Nutrition is probably one of the most important factors influencing susceptibility to infection, but also one of the most difficult to evaluate. Body weight is not a significant index. The last war demonstrated what could happen to the tuberculosis rate when a prosperous country like Denmark was suddenly deprived of its food supply. The incidence of disease in the age group 20 to 25 increased by 30 per cent. When the embargo was lifted, the tuberculosis rate promptly fell again. Faber attributed this to the low nitrogen intake of these growing adolescents. Dr. Johnston pointed out that the diabetic are particularly susceptible to tuberculosis and that in the frequent phases of acidosis they show negative nitrogen and calcium balances. It was his impression that depletion of the reserves of both these elements precedes as well as accompanies development and spread of tuberculosis. The influence of fatigue was studied in the automobile industry and in a steel mill. In neither case was there evidence to suggest that this factor was responsible for any excess of tuberculosis.

Abnormal degrees of temperature and humidity have likewise been alleged to lower resistance to tuberculous infection. This belief has little to support it.

Trauma does not initiate a primary tuberculous infection of the lungs. The decision of traumatic origin involves not only x-ray findings but the past history and clinical course of the disease before and after injury.

Tuberculosis has been regarded as the great enemy of the printer and in turn was attributed to lead poisoning which printers [might have] contracted. This group and the painters have from 16 to 17 per cent more tuberculosis than all occupied males. Among lead and zinc workers an excess of nearly 8 per cent was reported by Whitney. Dr. Belknap made physical examinations with sedimentation time determinations on 40 printers and found nothing suggestive of tuberculosis. He felt, however, that the storage battery plants would be a better place to evaluate the effects of lead. Here there is plenty of lead dust in the atmosphere, and the incidence of lead absorption is high. He reported his findings on 97 workmen followed from five to eleven years in a battery plant where the labor turnover had not been more than two men a year. Of this group 77 per cent had had lead absorption with occasional attacks of lead poisoning. On x-ray examination only 3 cases of tuberculosis among the 76 were involved, and in 2 of these the infection was apparently old and healed. Dr. Belknap felt that neither lead absorption nor lead intoxication was the cause of the reported excess tuberculosis in this group of trades.

Fumes and gases are inhalable, and many of them are sufficiently irritating to provoke severe inflammatory reaction. Mature judgment on the effects of gas used by the armies during the last war reversed the early opinion that this agent was responsible for the excess of tuberculosis that developed. The report of the Surgeon General of our army for 1919 gave

the tuberculosis rate for gassed soldiers as 2.45 and that for all enlisted personnel as 4.3. In 1930 Price summarized the final experience of all nations participating in that war and reported the unanimous opinion that the increased tuberculosis rates were not the result of exposure to irritant gases. Evans drew similar conclusions from his routine annual examination of a large group of employees of the du Pont Company engaged in the manufacture of chlorine, phosgene, hydrofluoric acid and other irritating gases. In a study of a group of men exposed to sulfur dioxide Kehoe and his associates discovered no excess of tuberculosis, and the same apparently applies to smelters handling sulfide ores. The Metropolitan Life Insurance Company's tables give the standardized relative index of tuberculosis mortality for chemicals and explosives operators as only 85, on a basis of 100 for all occupied males. Experimental evidence is likewise generally negative.

The general thesis that inflammation of the lungs is necessarily unfavorable to the course of associated tuberculosis has little support. Dr. Siegal reported that in roentgenographing 5,000 patients in general hospitals he had found no excess of tuberculosis in those admitted for acute respiratory infections. On the relatively rare occasions when tuberculous patients develop lobar pneumonia the chronic infection is found unaltered when the acute one has resolved. In the Saranac Laboratory literally hundreds of guinea pigs have been infected by the inhalation of attenuated tubercle bacilli. If chronic epizootic pneumonia happens to be present in one or more lobes of the lungs the tubercle bacilli fail to localize there but develop in the other lobes. If the pneumonia appears after the tubercles have formed, their usual self-limited course is unaffected.

It is probably true that certain kinds of inflammatory reactions may have more influence. The increased incidence of tuberculosis that followed epidemic influenza may have been due in part to pneumonic complications. These inflammatory reactions are peculiar in that they involve blood vessels and destroy the fixed tissues of the lungs. However, the common report that the onset of tuberculosis followed an attack of pneumonia is not infrequently due to faulty diagnosis during the acute phases of the tuberculosis itself.

Dr. Adelaide R. Smith reported on grain handlers exposed to high concentrations of organic dust in unloading lake steamers. She found that 2.5 per cent of a group of 234 showed x-ray evidence of clinically significant tuberculosis and that another 2.3 per cent had old healed lesions. Social economic factors rather than grain dust were thought to be responsible. Another organic dust, tobacco, has been under suspicion as a cause of tuberculosis since Ramazzini's time in 1700. Dr. Charles Francis Long described conditions in a modern cigar factory. Here there was less tuberculosis than in the city where the plant is located. However, this is not surprising in view of a well organized medical service and air conditioned workrooms. Plants like these must be affecting the picture, as the latest Metropolitan mortality figures for 1937-1939 show an index for tuberculosis of 107 in cigar and tobacco factory operatives. In 1922-1924 it was 135. Dr. Long believed that the former high rates for tuberculosis in the industry were due to social-economic factors and the selection of such work by the under par. Seventy-five per cent of the labor, which now produces only 25 per cent of the product, still works in small shops without health supervision.

Dr. Brumfiel reported the very low rates for tuberculosis found in the Saranac Laboratory studies of the cement and gypsum industries. Among 2,278 cement workers in eleven plants scattered widely throughout the country there were only 4 cases of clinically significant tuberculosis, a rate of 0.18 per cent. Among 175 gypsum workers there was only 1 such case, yielding a rate of 0.57 per cent. In both groups the usual amount of healed infection was disclosed, so that opportunities for infections had not been lacking. Dr. Benson reported that Vermont marble workers had two and one half times as much tuberculosis as the general population of the state, exclusive of the granite center in Barre. It should be recalled that Vermont's population is largely rural. By contrast, the rate for granite workers was one hundred and thirty times the general one. All

these observations support the view that exposure to organic and nonsiliceous dusts has little influence on susceptibility to tuberculosis.

A day was devoted to a consideration of the effects of dusts high in free silica. Reports on foundries, quartz mining and the granite industry brought out that higher tuberculosis rates prevail in these trades, that there is a greater tendency for such infection to develop after age 40 rather than earlier and that the infection is extremely chronic, often giving no symptoms of intoxication or a positive sputum until shortly before death. Mr. Cummings pointed out that in miners the incidence becomes higher and the prognosis of associated tuberculosis worse as the severity of the silicotic reaction increases. Miners exposed to silica dust with no roentgenographic evidence of reaction showed little more tuberculosis than the community in which they lived. Dr. Greenburg, Dr. Pope and Dr. Sander pointed out that among silica industries the foundries caused the least amount of tuberculosis, and Dr. Benson's report on the granite industry showed that it probably caused the most.

Dr. Siegal told of survey methods and where it might be profitable to look for tuberculosis. The most productive source was among household and other contacts and in groups between the ages of 15 and 30 who were readily accessible. Negroes and those in the lower income brackets were particularly fruitful sources.

Dr. Bristol pointed out the educational value of demonstrations like those in the Bellevue-Yorkville District and in Cattaraugus County, N. Y. Defense industries are bringing thousands into cities not prepared to house them, families have been disrupted and many are being subjected to unusual strains. The food supply is adequate, but overcrowding and attendant social-economic factors will take their toll if we are not on our guard. Already there are indications that the death rate has ceased to decline.

Dr. Sawyer presented details on the program of control that has operated so successfully under his direction for the past nineteen years in the Eastman Kodak plant. It costs \$10,500 annually, but it also costs \$3,218 to treat 1 minimal case of tuberculosis. The attack rate in this plant has fallen from 2.3 at the outset of his study to 0.2 at the present time.

The interest of the compensation insurance carrier in tuberculosis has become progressively real. Mr. Henry Sayer reviewed the successive modifications of legal opinion that are leading to the general acceptance of tuberculosis as an occupational disease. He asked whether it might not be wise to admit that some of it is occupational in origin but to define by scheduled law the conditions under which it should be compensable. Questions of fact he would leave to a medical board. His proposals brought objections on two grounds: (1) that management would seek to protect itself by excluding even healed tuberculosis in the preemployment examination, thereby creating a group of unemployables, and (2) that such a plan would in reality become health insurance by opening the door to include heart disease and all other chronic conditions.

Mr. Cummings proposed an alternative plan. He suggested that evidence of tuberculosis in any form should preclude employment in industries with silica or other proved hazards and that compensation should be allowed for all tuberculosis subsequently developing in such employment. In other industries, with no specific hazards, he would permit persons with healed tuberculosis to work but would allow no compensation for infections that might become active or develop during employment. In view of the evidence that old tuberculosis so rarely breaks down in any industry except industries with silica hazards, this would appear most equitable.

A labor point of view on tuberculosis was presented by Mr. Woll, who protested against abuse of medical examinations.

The symposium closed with a summary which pointed out that, aside from nutrition and social-economic factors, silica was the only other one which had a recognized effect on susceptibility to tuberculosis. Many industrial conditions popularly accepted as predisposing to this disease were without measurable effect.

Procurement and Assignment of Physicians for Industry

MAJOR SAM F. SEELEY, Washington, D. C.: All physicians, dentists and veterinarians, for purposes of procurement and assignment, fall into three age groups: 45 and under, 45 to 60 and 60 and over. Congress has said that every man physically fit under the age of 45 shall be made available for military service. Essential personnel on medical school staffs, on hospital staffs, in industry and in nonmilitary organizations should wherever possible be over the age of 45. This refers to nonmilitary governmental services as well. Dependence may also be placed on those men who cannot pass physical examinations for commission in military service, on women physicians and on men who are not doctors of medicine but whose training allows them to substitute for male physicians under 45. The Procurement and Assignment Service is charged by the President to reserve from military service men who are essential, but the burden of proof as to the essential nature of each individual rests on the employer, according to act of Congress. Surveys already made and to be conducted by county, state and corps area advisory committees will assist in classifying physicians. Each corps area committee will consist of a chairman, a medical educator, a hospital representative, two general practitioners, two dentists and one veterinarian. These boards will act as referees to determine the availability of physicians for various kinds of service and will be expected to take the brunt of any criticism as to the availability or nonavailability of all physicians. A master questionnaire is now being drawn up on which these appraisals may be based. The Industrial Health and Medical Committee, acting in an advisory capacity to the Procurement and Assignment Service, is constructing that portion of the questionnaire which will assist industrial organizations in determining which men are essential. As shortages are defined, the Procurement and Assignment Service will assist in locating personnel in all specialty classifications.

JANUARY 12—AFTERNOON

DR. WARREN F. DRAPER, Washington, D. C., in the Chair

A Dental Program for Industry

R. M. WALLS, D.D.S., Bethlehem, Pa.: A study recently made to determine how many industries operate dental services revealed that, out of eight hundred and forty-one industries listed by the American College of Surgeons and to which questionnaires were sent, four hundred and ninety-eight, or 59 per cent, replied. Of these one hundred and sixteen, or 23.3 per cent (13.8 per cent of the whole number), reported having a dental service. About one company in ten employing more than five hundred people and having an approved medical service maintains any dental service whatever. Forty-two per cent of the dental services are in plants in the Eastern states, 37 per cent in the Middle West and 21 per cent in the Southern and Western states and in Canada.

Considering the great interest that industry has shown in the health and welfare of its employees, it is rather difficult to understand why the dental health of these people has not been included. It is possible that the expense entailed may curb at least the small companies from establishing a dental service. In a study of dental clinics of fifty-nine companies made by the Division of Hygiene of the Pennsylvania Department of Labor and Industry, it was found that the average cost of equipping a dental clinic was \$1,958.03. This figure would probably reach \$2,500 today. If a medical service is already in existence, a great saving could be made by the use of the existent x-ray facilities, so that initial expense should not rise above \$2,000. Figures obtained from the study gave yearly expenditures by the company toward dental service of from 64 cents to \$9.45 per patient treated. These figures vary so widely that attempts to analyze them would be futile. A hypothetical dental budget drawn up by the Metropolitan Life Insurance Company for a company employing one thousand persons and wishing to establish a dental office on its premises for examination and prophylactic work, emergency, consultation

and first aid service, extractions and cement fillings gave a figure of approximately \$2,000 for initial installation and \$5,400 for yearly running expenses.

Dental service in the industries when practiced was most frequently paid for by the employer as his contribution toward the good will and efficiency of his working force. Next in frequency is a cooperative arrangement wherein the company furnishes space for a dental office and perhaps also a certain amount of major equipment. A local dentist comes in, usually on a part time basis, bringing with him his own instruments and supplies and usually charging fees by the operation. These fees are usually lower than in an outside practice because the dentist's overhead is cared for, his practice is steadier, his bills are easier to collect and he can make a reasonable income at a reduced price.

Another procedure, found chiefly among large corporations with well developed employee welfare policies, involves the use of a mutual benefit association. These associations are organized among the employees for the purpose of group purchase of medical and dental care and often for a variety of other purposes as well, and in the better examples the company management makes a contribution to the association either in the form of a sum equivalent to a percentage of the dues collected from members or in the form of space and equipment for the conduct of the benefit association's activities, or both.

Part time dentists are employed almost four times as frequently as are full time dentists. Private practice keeps the dentist in competition and awake to new developments. It is possible for the management to evaluate his skill in terms of his success in private practice. Dentists are to be found in control of the professional standards of by far the majority of the dental services, while executive responsibility rests more frequently in the hands of a physician, personnel director or one or the other of them in combination with the dentist. Only a few corporations reported that they had encountered any opposition on the part of local dental societies. An equally small number reported that they had consulted the local society at the time their service was set up. A large majority of companies allow time for the performance of the dental operations specified in their services, without any deduction for the time lost by the employee.

An ideal dental service in industry is one established under the direction of the medical service headed by a qualified dentist. There should be a system of complete and accurate records of the oral conditions of all employees. A mouth examination should be made of every applicant for a position or on the presentation of a certificate from his dentist. No employee should be admitted whose mouth shows gross lesions of any communicable disease or evidences of infection. A mouth examination should be made every six months, bite wing diagnostic films being made, and defects charted. A prophylaxis should be given by the dentist or by a hygienist and the employee referred to a private dentist for any reparative work that is indicated.

Only about one third of a given working force appear to be sufficiently interested in health to respond to the company's invitation to receive this dental service. Employees who are engaged in occupations requiring the use of lead or mercury, acids, radioactive materials or carbohydrates should have more frequent examinations. Employees receiving injuries to the teeth or supporting tissues should be referred immediately to the plant dentist; also those who have developed oral manifestations of occupational diseases.

Certainly there are many industries that will find it unnecessary to employ a full time dentist, and it may be advisable to employ a hygienist who will relieve the dentist of the prophylaxis service. The company should not attempt to supply operative and other types of dental treatment which are available from the licensed dental practitioners of the community at fees which the employees can meet nor should it interfere with the freedom of choice of practitioner on the part of its employees who are able to receive private treatment.

Industrial Dermatoses

This report, by the Committee on Industrial Dermatoses, Section on Dermatology and Syphilology, American Medical Association, Dr. C. Guy Lane, chairman, appears in full in this issue, page 613.

The Workmen's Compensation Medical Panel System of New York State

DR. DAVID J. KALISKI, New York: Prior to 1935 an injured workman who was entitled to compensation and medical care under the workmen's compensation law could not select his own physician. The law was amended in 1935, giving the injured employee the right to select his own physician provided only the physician had complied with the law by obtaining the necessary authorization to treat compensation claimants. The industrial commissioner was authorized to establish a schedule of fees for medical services, prepared on the basis of fees submitted by the president of the Medical Society of the State of New York.

The law provided that the employer shall have the right, subject to regulations prescribed by the commissioner, to recommend to the injured employee the names of enrolled physicians whom he believes competent to treat him. Insurance carriers were also given the right to maintain rehabilitation bureaus operated by qualified physicians if approved by the medical society and authorized by the commissioner. An employer was given the right to maintain a compensation medical bureau at the place of employment, if such medical bureau was required because of the nature of the industrial hazards or the frequency of injuries to employees arising out of industry. The claims of authorized physicians for medical services are no longer subject to approval or certification by the industrial board.

Public hospitals maintained by taxation are permitted to treat only emergency cases. The law provides for the establishment of laboratories or bureaus engaging in x-ray diagnosis, roentgen treatment or physical therapy but all such laboratories or bureaus must be operated or supervised by qualified physicians duly authorized under the law and subject to the approval of the medical society board of the county in which they are located.

The Industrial Council of the Department of Labor was enlarged from ten to fifteen members; five of the members represent the interests of employers, and five are physicians licensed to practice and known to represent the schools of medical practice eligible to practice under the workmen's compensation law. These appointments are made by the governor. The council is advisory to the industrial commissioner and may on its own initiative recommend to the commissioner such changes of administration as it may deem important and necessary.

Emergency first aid treatment may be rendered by any licensed physician, but continued treatment may not be rendered by such physician unless he is duly authorized. A licensed physician who is a member of a duly constituted medical staff of any hospital may render medical care while an injured employee remains a patient in the hospital. Under the personal supervision of an authorized physician, medical care may be rendered by a registered nurse or a registered physical therapist.

The statute specifically imposed on the compensation committee or board the duty not only of qualifying the physician but of including in this qualification the character of the medical care which the applicant is qualified and authorized to render. Similar provisions are made for the application of pathologic and x-ray laboratories. It is definitely provided that physicians in charge of pathologic and x-ray laboratories must be qualified and authorized. Since the inception of the law there has been a gradual evolution in the method of qualifying physicians, and the standards of qualification for specialists have also gradually increased. The law imposed on the sixty-one county medical societies of the state a huge task and responsibility, for during the first few months the workmen's compensation boards had to be appointed, and in the larger county medical societies special quarters and clerical staffs had to be set up.

The New York State society committee has set up examining committees in radiology and radiation therapy which meet periodically and examine candidates for x-ray rating if the local county society committees are unable to evaluate their qualifications on the basis of the credentials submitted in the application.

Osteopaths may now submit evidence of qualification in minor surgery and obtain a license to perform minor surgical procedures.

By March 1, 1941 about nineteen thousand physicians and specialists were qualified in this state, the vast majority of them by the county society committees. There are at present sixty-one county society compensation committees.

The work of these committees is coordinated by the Bureau of Workmen's Compensation set up by the state medical society, and the director of this bureau is a member of the state council committee of workmen's compensation, consisting of three members.

The arbitration proceedings are set up in accordance with the arbitration laws of the state of New York, and all awards are final and binding on both parties.

The chief recommendation made by the commissioner and enacted into the amended law was the free choice of physicians with adequate control over such physicians by a body best suited and able to control them, namely the organized medical profession.

Mass Roentgenography of the Chest for the United States Army

MAJOR ALFRED A. DE LORIMIER, Washington, D. C.: This article will be published in full in *War Medicine*.

JANUARY 12—AFTERNOON

DR. LEVERETT D. BRISTOL, New York, in the Chair

SYMPOSIUM ON UNDERGRADUATE INDUSTRIAL MEDICAL EDUCATION

Present Problems in Curriculum Adjustment

DR. RAYMOND B. ALLEN, Chicago: Universities are continually pressed with the problem of adjusting the requirements of specialties to a unified curriculum in the medical schools. The faculty of medicine has the responsibility of presenting laboratory and clinical experience to the student body in such a way as to guarantee that each student secures sound training in the fundamentals of medicine. No pretense is made these days to present all the information which exists in the body of medical science, but the fundamentals can be and are taught very effectively. In addition, we must emphasize during the present emergency the military and industrial aspects of medical science in order that the products of medical education may be able to fit smoothly into the needs of the social, industrial and military establishments.

Industrial health problems have assumed major proportions, owing to the rapidly increasing industrial population and by the impact of war production. In fact, industrial health is now recognized as a special field in public health administration. Preventive medicine and industrial health have also become, almost over night, vital factors in the national victory program. The medical profession and medical educators will accept this challenge and make a worthy contribution.

Medical schools can contribute in several ways. All fundamental and clinical departments must emphasize instruction bearing on industrial and military medicine. Such instruction must be coordinated by periodic interdepartmental staff conferences. If not already created, a survey course should be established for upper classmen in the general field of industrial hygiene and occupational disease, including laboratory work, clinical demonstrations and field trips. Teaching should include workmen's compensation, safety engineering and commercial and business administrative problems bearing on the welfare of workers. Also elective courses should be provided for students desiring advanced work. The theory and prac-

tice of first aid needs greater emphasis. Internships should be adjusted to reflect in greater degree the problems of industrial health through special study of occupational disease. A short service in the medical department of some factory is desirable. Long-term graduate courses in public health administration leading to proficiency in industrial health and control of occupational disease are greatly needed, as are also short courses for practicing physicians engaged in some form of industrial medical service. These courses should be of two kinds, refresher and advanced specialized study. The medical schools are endeavoring to play their part in developing programs that will better serve industrial medicine, industrial health and the welfare of workers on the civilian defense front.

Industrial Health—A Separate Discipline

DR. T. LYLE HAZLETT, Pittsburgh: No one will dispute the importance of industry in the United States at the present moment. Thirty-four million people are now employed by industry, and all are doing an essential job. Modern warfare requires the mental and manual work of twelve million persons to maintain one million under arms. With a high percentage of the thirty-four million industrial workers forming the backbone of our national defense, time lost because of accidents, health hazards and improper placement of the workers can be regarded as an actual wartime casualty. These thirty-four million people are spending at least 24 per cent of their present existence at work. What accepted specialty in our profession offers such an opportunity for health influence and guidance? If viewed in this light, certainly industrial medicine with its infinity of ramifications deserves a place of its own as a recognized and distinct specialty in the field of medicine.

The history of industrial medicine can be traced from simple first aid administration to its present place as a consulting service in the placement of workers, environmental control and health maintenance of employees as well as the immediate care of sickness and injury of the industrial worker while at his occupation. This story reveals the rather insignificant role of the physician in this evolution. Compensation laws, employee interests and economic trends have demanded increased efforts from physicians, thus presenting greater opportunities for preventive as well as curative medicine. Why do physicians often-times find themselves in subordinate positions, since no other group with their training and experience is so well fitted for guiding such programs in our industrial organizations?

What is to be done to rectify this condition? Only by providing sufficiently well trained men in this field can industrial medicine be properly emphasized and the importance of its place in medicine and industry clearly outlined. With the present interest evidenced by government, labor and industry in the conservation of manpower, no salesmanship should be necessary to place such a group of trained men. This group should use its influence to effect a change in the modern medical curriculum to include sufficient teaching of industrial medicine and to present its scope and its future. This would allow the student to evaluate this branch of medicine as a future field for specialization just as he does obstetrics, surgery and other specialties.

The field of industrial medicine is too far reaching to be covered in undergraduate years, but a certain number of hours could be devoted to preparing the student for a graduate course similar to the training required for admission to the various specialty boards now in existence. Such a course would fit a physician to be called a specialist. If such a curriculum should be adopted and industry could secure pretrained men, thoroughly acquainted with the problems to be met and handled, I feel sure they would be properly remunerated and be able to render a valuable service.

In planning for instruction in the undergraduate curriculum we should have in mind the following ideas:

1. Industrial medicine should be offered to undergraduates as a separate course. Disconnected bits of information in the various courses throughout the four year curriculum do not constitute sufficient instruction in this field, and the importance of the subject is lost.

2. The lecture hours should be devoted to industrial topics. The scope of industrial medicine, its history and importance should be presented. Following this instruction, there should be such broad groupings as (a) orientation and general considerations, (b) placement of the worker from a physical and mental standpoint, (c) routine role of the physician in the plant, (d) hazardous occupations (determinations, preventive health measures), (e) general health education and (f) research (a field unlimited and constantly widening). Such a program is entirely feasible even if only twenty hours is given in any one academic year—preferably in the senior year. True, only the surface of the subject would be scratched, but a stimulus for future study in graduate work would be implanted and the entire class would get sufficient insight into the subject to respect its importance.

The faculty for both undergraduate and graduate instruction in this special field of medicine may very readily be gathered in most communities in which medical schools are located. Self-trained industrial physicians are available for such teaching. Chemical and engineering instruction is likewise readily available.

This presentation has been given as a challenge to those who carry the responsibility for industrial health to help in every way possible. Let us be able to offer to industry physicians with sufficient knowledge so that they may assume their proper responsibility and status. The work of these trained men will be a bulwark against certain socialistic trends which are constantly appearing on the horizon. And at no time in the history of our country has so much depended on the conservation of man power among our industrial workers as at the present time.

Correlation of Industrial Hygiene Instruction with Other Clinical Training

MR. DONALD E. CUMMINGS, Denver: Medical schools and schools of public health should assume responsibility for supplying competent industrial physicians by including suitable industrial hygiene training in their courses of instruction. The problem of incorporating this subject in an already crowded curriculum is only part of a greater challenge to offer adequate teaching in preventive medicine as a whole. Many medical schools should accord industrial hygiene instruction greater distinction, recognizing the subject either as a separate discipline or as an important division of departments such as medicine or preventive medicine and public health.

The primary requirement for satisfactory industrial hygiene training will be discharged only when industry is represented in the classrooms and clinics of the teaching hospital by an instructor possessing an intimate understanding of, and sincere devotion to, the peculiar health problems of the worker. Experience in industry is the key necessary to unlock the door to the treasury of information which imparts reality and interest to the student. This knowledge not only should be available but should be utilized in the outpatient department, in the hospital wards, at meetings of the staff and in teaching clinics. The attention of these groups should be focused repeatedly on the mortality and morbidity experience of various occupational divisions of the population as well as on the industrial conditions producing unfavorable records and on the practical measures which may be adopted for their control. Contributions of this nature prepare medical students for more constructive service than merely ministering to the hurts and ills of industrial workers.

At the outset of clinical instruction the industrial hygiene department should demonstrate in clinics the proper manner of eliciting and recording an occupational history. The importance of this record should keep the entire medical staff alert in recognizing the occupational problems. A simple tabulation of the principal occupations classified according to the hazards or diseases common to each will serve as a useful guide to both students and interns.

Occupation also should be assigned an important place in the statistical classification of all medical records in the hospital

and outpatient department. An analysis of the common diseases diagnosed or treated in the institution, by occupation, serves a more useful purpose than a tabulation of the specific occupational disease cases observed during the same period and should be discussed with the staff and students at regular intervals.

Another meritorious arrangement consists in having an industrial hygienist participate regularly in ward walks, appropriate medical clinics, roentgenologic and clinical-pathologic conferences so that both staff and students study a patient in relation to his working environment with as much interest as is attached to the manifestations of disease. In many hospitals where teaching otherwise is excellent the significance of industrial influence on such common diseases as pneumonia, tuberculosis and degenerative disorders frequently is overlooked completely.

Training also is facilitated by suitable laboratory demonstrations and by the use of appropriate museum material or exhibits. The industrial hygiene department should be willing to assist other departments offering laboratory instruction in technics and tests applicable to industry, or it should maintain a separate laboratory for this purpose, so that students will become familiar with the special procedures utilized in industrial toxicology and hygiene.

The most essential requirement for this type of training is an industrial medical clinic. In this clinic the health of hospital and medical school workers and applicants for employment is appraised and supervised. Around this point are focused the medical procedures developed to discover, treat or control occupational disease in individuals entering the hospital or outpatient department or among hospital employees; here are centered the standardization and supervision of public health practices applicable to the operation of the plant, and here are maintained records and methods which illustrate proper administration of an industrial hygiene department. Medical students and interns serving in this type of clinic under the direction of competent industrial hygienists derive experience which makes the application of preventive medicine both attractive and inspiring.

Many talents must be united to achieve healthful working conditions, and it is doubtful whether any other branch of medicine requires such a high degree of cooperation with other services to obtain successful results.

The Industrial Clinical Clerkship

DR. FRED J. WAMPLER, Richmond, Va.: Industrial health as conducted by the more advanced industries is preventive medicine in the fuller sense of the term. If a medical student can get a truer picture of what the public health movement is by working in a health department, then a medical student should get a better idea of what advanced industrial medicine is by working in a progressive industrial medical setup.

Out of the fifty-one medical schools in the United States and Canada reporting organized teaching in industrial health, only one reported an elective in which the student went into the plant and worked with the physicians and staff of the pathologic and toxicologic research laboratories of the industry.

In the Medical College of Virginia the clinical clerkship in industrial health consists of two weeks spent in a chemical plant employing between three thousand five hundred and four thousand workers, in which there are five full time physicians and eight nurses in the medical department. Another two weeks is spent in another plant of the same company with entirely different chemical hazards and problems. The second plant has seven full time physicians and twelve nurses for seven thousand employees. Two days out of this second two weeks are spent visiting the headquarters organization of this industry. Another day is spent in the toxicologic research laboratory. The students work with the doctors, watch pre-employment examinations, see the patients who come in for inspection or advice and read roentgenograms that are taken of the employees as if working in a clinic in an outpatient department. Required readings on industrial health, occupational diseases, compensation laws and plans for giving better

health services to small plants are assigned. These are discussed with the student during his course or at its completion. Five students out of a possible eight appointments took the elective the first year, six the second year, and two the third.

Difficulties in establishing industrial health clerkships are numerous. Only a small percentage of plant managers will agree to start the program. Progressive plant physicians willing to assign time necessary to teach the students must be found. Some students, for emotional and personality reasons, would not be acceptable. Before this plan can be adopted, the course in medical schools must be arranged so that the senior student can spend the necessary time in nonresident work. The attitude of organized labor toward medical and health services by the employer has generally been unfriendly and in some cases openly hostile. The cost to the medical student is a problem. Some way will need to be worked out so that the extra cost of going to plants or even living away from school can be met. A temporary difficulty now is the great difficulty of getting any outsider in plants holding defense contracts.

In spite of present difficulties, the industrial clinical clerkship for senior medical students should be adopted as fast as is consistent with healthy growth by the medical schools of North America. Where this cannot be done, field trips of at least one-half day's duration should be taken to progressive medical departments in industry where the medical director can show what the industrial physician is doing and can do for the employee and how he and the family physician can mutually assist each other in keeping the industrial population well.

Industrial Experience in the Internship

DR. WILL F. LYON, Chicago: One of the larger teaching hospitals in Chicago realized that too few accident cases were admitted for the proper training of their interns. The idea of obtaining clinical experience in these and other directions in industrial plants was suggested by the preceptorship plan of the University of Wisconsin. Experience of this kind should enable a physician to regard occupational disease hazards intelligently, to assist in the examination of employees and to organize an effective industrial medical program. The interns, therefore, were assigned to a plant. The management willingly offered to put them on the payroll, but it was decided that it was inadvisable to compensate them. Each of the interns kept a notebook during his six weeks' service in the shop, which was checked after each division of experience by the physician in charge. They were accompanied and supervised in all activities by the safety or chemical engineer, who explained manufacturing processes, and by the physicians. Each visited the entire plant slowly enough so that he had a chance to observe at first hand all industrial health problems. He was present during preemployment examinations and was taught as well as could be the evaluation of some of the factors attending employment or rejection. The intern was also instructed in the estimation of disability through direct examination and proper recording of such findings as muscular power, nerve function and other appropriate factors. Under this system of instruction it was possible for the intern accurately to estimate the disability. The management of accidents included everything from scratches and superficial foreign bodies in the eye to serious burns. The intern was kept informed of progress after hospitalization.

An intern service of this kind in the larger industrial plants where competent physicians are in attendance would shortly result in the development of many more physicians familiar with industrial problems. It is extremely important that as many doctors as possible in every community be so informed because of the possibilities of sabotage and bombings. If this program could be carried on there would be less disquieting friction between physicians in general practice and industrial physicians. Interns, of course, should not replace medical, nursing or first aid personnel. There should be no suspicion of exploitation of interns for the benefit of industry. The whole training period must be designed to provide maximum educational benefits.

The Occupational Disease Clinic

DR. MILTON H. KRONENBERG, Chicago: The purpose of an occupational disease clinic should be (1) to study scientifically disease and disability resulting from environment in industry and to spread this knowledge, (2) to promote clinical research in the health problems associated with expanding industrial technology, (3) to study clinical material disinterestedly and not to establish liability and (4) to service as a fact finding body.

Factors that enter into the successful organization and operation of such a clinic are the opportunities for successful clinical teaching of the occupational diseases in other clinics, the complex nature of the material, correlation between dispensary units in case records and other data applicable to industrial exposures, suitable time for a scheduled period and a conviction that occupational diseases are interesting and dramatic.

Patients originate from private physicians seeking diagnostic aid in questionable cases. They may be indigents seeking specialized professional care. The patient may also be referred by a charitable or welfare society or private, official or semi-official agency. In other cases clinical material is made available by requests for consultations from other clinical units of the dispensary. Then there are instances in which employers themselves deem it advisable to refer questionable cases for medical opinion by this clinic. Industrial workers as well as insurance carriers and attorneys also like to make use of specialized services. However, not all cases are eligible, and the tendency is to limit admittance for such reasons as not meeting the social service requirements of the clinic: the individual who seeks a diagnosis for litigation purposes and the patient who has been under medical management elsewhere and is not satisfied with his progress.

Assuming, however, that the patient is eligible for clinic registration, he must be checked for an admitting diagnosis. The examining room physician must rapidly assemble the subjective complaints and objective findings in order to assign the case. In spite of the fact that the admitting room physician exerts every possible means to arrive at some accurate diagnosis, too many cases are referred to other clinics. If enough data are available, the occupational disease clinic should see the case and rule out the industrial exposure.

Clinical teamwork is necessary. A cutaneous rash due to chrome is just as important to the occupational disease clinic as it is to dermatology, and, while the blood picture from benzene poisoning is dramatic to the student in hematology, it is also of value for demonstration purposes in an occupational disease clinic.

The medicolegal involvements encountered in administering an occupational disease clinic are unfortunate. This is due to laws and regulatory bodies which tend to impede the objectives of sound medical education in this specialty. In order to retain public and professional confidence to which medical education is entitled, such a clinic might be required to curtail its activities and efforts.

The frequent demand that clinic instructors comply with subpoenas issued for their appearance for hearings before boards of arbitration and compensation works a hardship and is annoying as well as time consuming to clinic personnel. It frequently discourages further collaboration on the part of other clinics which do not desire to become involved in litigated cases. Perhaps this can be overcome if those who must be summoned are subpoenaed as factual witnesses and not as expert witnesses.

The university must insist on and the clinic follow a totally neutral and unbiased attitude toward the patient and industry. Reports and findings should be uncolored and prepared as facts which have been carefully weighed for significance and fairly interpreted according to the best available knowledge in the field.

Full time and part time industrial physicians should participate regularly in the conduct of such clinics. There are many universities that already have on their faculty physicians who are in charge of medical departments in industry. Additional physicians should be appointed if necessary according to univer-

sity standards and with a definite faculty rating. These physicians could present occupational diseases under their supervision, especially questionable cases for work-up, since these companies are already providing the worker with the necessary benefits provided for under the law. These physicians should be expected to demonstrate their cases, offer lectures, participate in staff conferences and engage in special research problems when indicated.

The private practitioner should have available the facilities of the clinic if the university can be spared the annoyance and responsibility of becoming involved legally. Perhaps a form could be prepared by the university legal department such as an operating permit for surgery. A report of the diagnosis would, of course, be furnished the physician who referred the case, and after the patient had been demonstrated to the clinic he would be automatically returned to his own physician for management.

Industrial commissions should agree to refer all cases in which petitions for compensation are filed to such a clinic for complete work-up. This would not mean that every case referred would be automatically considered an occupational disease, since awards are not made on all petitions filed. It would provide the commissions with factual data to assist these boards and arbitrators in their final decision for recommendation or denial of compensation.

A satisfactory procedure for developing and operating such clinics is essential, and the whole problem should be examined critically and sympathetically if a working plan is to be developed.

DISCUSSION

DR. VICTOR HEISER, New York: It has been my hope that the medical profession would not show that same lack of vision in industrial health that it showed with regard to the public health movement. At the beginning of the century there was created a huge demand for health officers that the medical profession was not ready to supply. Doctors everywhere accepted these jobs and largely discredited the movement in the beginning. The Rockefeller Foundation had to create schools of public health to provide teachers and to put the public health movement on a preventive basis. In industrial medicine we shall be able to avoid this mistake if we show the necessary vision. We can educate management in a short while to demand good industrial medical service, but the program cannot be pushed too hard because qualified doctors are not available to take these places. The medical profession, therefore, is losing a great opportunity for profitable employment. By others in the so-called social groups, it is forced into a subordinate position. The educational attainments of the physician should put him in the position of leadership. We can adequately meet the demand when we start some schools of industrial hygiene. A committee of the American Public Health Association has been at work on a suitable curriculum for some years. It is desirable to bring some concept of industrial medicine into the mind of the medical student, but at the most he cannot be taught very much. He cannot be taught enough to give the kind of service that industry has a right to expect. Industry feels that it should not teach doctors their business but that they should be able to find ways and means of doing that themselves.

DR. WALTER L. BIERRING, Des Moines, Iowa: The short courses that have been established at the schools of public health at Harvard, Johns Hopkins and the University of Michigan offer an opportunity for the general practitioner to obtain a fundamental knowledge of industrial hygiene and industrial medicine.

DR. CARL-GUSTAF TILLMAN, Topeka, Kan.: Not only does industrial medicine concern itself with problems that are specific to it, but inherent within the industrial organization are other hazards which have emotional repercussions exerting secondary effects on the body and particularly the efficiency of the worker. The industrial physician must acquaint himself with sufficient knowledge of psychiatry that additional functions belonging to him will not be taken over by other agencies in the public health field. The interpersonal relationships within industry are as important to the worker's health as the physical hazards.

JANUARY 13—MORNING

DR. HARVEY BARTLE, Philadelphia, in the Chair

Conservation of Man Power in Connecticut

DR. CLIFFORD KUH, New Haven, Conn.: At the first meeting of the Committee on Industrial Health of the Connecticut State Medical Society in 1938 it was decided to approach the problems of industrial health in Connecticut jointly with the Manufacturers Association of Connecticut. The state society committee is made up of full time and part time industrial physicians, the director of the bureau of industrial hygiene in the state department of health, and several other full time public health administrators. To satisfy the immediate needs of physicians, a postgraduate course in industrial medicine has been given, a section on industrial health has been organized in the medical society, and a regular department on industrial health has been arranged for in the *Connecticut State Medical Journal*.

A joint enterprise of the manufacturers' committee and the committee in the medical society was the preparation of a brochure, "Conservation of Man Power," which was widely distributed. It comprised discussions of the objectives of industrial medical service, the functions of the plant medical department, organization of the industrial medical service and a plan for assisting industries in the discovery and control of industrial health problems. In the brochure an inquiry form was distributed to be completed and returned by manufacturers. This plan enabled the manufacturer to request specific assistance in developing a health program and enabled the committee to survey existing industrial health facilities based on information supplied by the manufacturer. The questionnaire data which was assembled and distributed to seven hundred and forty manufacturers indicated that most aspects of medical care were inadequately developed or were at a minimum or absent in smaller plants, that first aid and emergency treatment were well developed, with minimal utilization of other medical techniques and that dental service is infrequent. The smaller the plant the greater the disadvantage in supplying all forms of adequate medical supervision. These findings agree with similar surveys conducted by the Council on Industrial Health and the National Association of Manufacturers. In the plants employing full time industrial physicians there were an average of two thousand two hundred and four workers per doctor. If this figure is accepted as the minimum justifying employment of a full time medical service, there should be fourteen additional full time industrial physicians employed in appropriate plants in the state. It was concluded also that twelve additional plants should provide part time service. Nursing care is received by 67.4 per cent of the workers included in the survey. Medical quarters were provided for 79 per cent of workers studied. Hospitalization insurance was provided for 78.7 per cent of the workers.

The manufacturers have been quick to appreciate the shortcomings revealed by this survey. A series of articles on the relation of health to armament production is appearing in *Connecticut Industry*. Within the last eight months the executive secretary of the state medical society has placed about twenty full-time doctors in the larger establishments. The manufacturers have called for the appointment of a subcommittee on standardization of medical practice and terminology, in the interests of uniform administrative procedure, physical examinations and record keeping. Another subcommittee will report on problems of the general health of workers, stressing particularly the nonoccupational implications. To interest more manufacturers, particularly the smaller ones, in developing a health program, a forum or clinic on health in industry is being developed in which both industrialists and doctors will participate, using the shortcomings revealed in our survey as a theme for discussion. Plans now call for a concerted effort to amalgamate the activities of all state groups interested in the development of industrial health—the State Defense Council, insurance companies, social agencies, Yale University School of Medicine, professional groups and manufacturers. Research will be conducted at Yale University in absenteeism records in smaller plants, the routine examinations and therapeutic work being done by local part time industrial physicians. This entire

project will be under the scrutiny of a special committee of the New Haven Medical Association for a trial period of two years. Cooperation, therefore, is also possible at the city level. In this connection an industrial health and safety exposition will be conducted at the New Haven Y. M. C. A. under the sponsorship of the local board of education, WPA, the health department, the Defense Council, the Foremen's Club, the chamber of commerce and the County Manufacturers Association. Educational material is being drawn from many sources on health and safety projects. If successful, it is planned to interest other local manufacturers in an attempt to influence public opinion directly in industrial health measures. Another innovation concerns the trade schools of the state, operating under the state board of education, which are investigating the desirability of instituting a health program for future workers preparing for industry. Each school will be considered as an industrial unit requiring the service of a part time industrial physician.

The most encouraging sign has been the cooperation of the State Manufacturers Association, which recognizes an obligation to meet the immediate needs of the war program through extending medical service into more plants and improving the quality and usefulness of that service.

DISCUSSION

MR. MARSHALL DAWSON, Washington, D. C.: The doctors should bear in mind that the great need of the nation is full utilization of all available man power. Unfortunately, in the past premedical examinations have been used as a means of screening out the labor supply and some employers have used this ostensibly admirable device to gain a competitive advantage; that is, as a means of skimming the cream from the labor market. It is timely to remind all physicians that there must be a shift in the accent and that they must throw the full weight of their influence into the use of these examinations as aids to proper placement and as aids to the reconditioning of impaired workmen.

Health Education for Industrial Workers

DR. LEVERETT D. BRISTOL, New York: Health education for industrial workers has evolved more slowly than health education in the school, in the home or among the population in general. Our present war efforts emphasize the need for greater attention to health education in order to conserve our human resources.

In 1939, the National Industrial Conference Board carried on a study of medical and health programs in industry, based on a questionnaire which was an adaptation of a survey form and on personal visits to many industrial plants. It was found that health education programs were maintained in approximately 60 per cent of the plants surveyed. The mediums used were health posters in 91.7 per cent of the plants, health bulletins and reports in 81.7 per cent, personal health interviews in 69.4 per cent, health articles in employee magazines in 33.9 per cent, group health conferences in 31.7 per cent, motion pictures in 9.4 per cent, formal health classes in 5.6 per cent and payroll inserts on health in 1.7 per cent of the plants. The United States Public Health Service has recently prepared a series of health pamphlets for industrial workers to stimulate interest by presenting in brief, attractive form the simple facts about (1) specific occupational hazards, such as fumes, dusts and toxic chemicals and (2) common health hazards such as upper respiratory disorders, appendicitis, heart diseases and pneumonia. In view of the rapid growth in industrial and governmental production resulting from the nation's war efforts and the associated concentrations of population and increasing health problems, the Public Health Service also has made available special health education consultants to various areas, particularly for work with state and local industrial hygiene units.

Health education is carried on through addresses, lectures, class instruction, informal talks, personal interviews, radio and talking pictures and through magazine articles, bulletins, leaflets, posters, charts, exhibits and silent films. In recent years the project or demonstration method has taken an important

part. "Teaching by telling" has given way largely to the more practical and successful method of "learning by doing." Any health education program for industrial workers must be continuous, varied, repetitive and motivating.

It would seem to be of special value to prepare health literature within the company for its own use. Needs and conditions, particularly among smaller industries, may be such that it is more feasible and economical to use health literature, posters or motion pictures prepared by outside organizations. Education material should be positive rather than negative and should stress "keeping fit" rather than placing emphasis on disease and medical treatment. Above all, material must be scientifically accurate. However, special diseases and abnormal conditions, particularly of an occupational nature, must be covered, but the preventive aspects always should be stressed.

It is desirable to have new employees attend at least one general talk on health and safety, particularly if any specific occupational hazards are associated with the work. The more active educational promotion of preventive geriatrics will do much to control those insidious diseases of our advancing years.

An interesting example of an organized group health education activity in industry is afforded by the experience of the associated companies of the Bell Telephone System. The course is voluntary and is given outside the employees' regular hours of work. Essential health facts are presented from the point of view of the effect of health on appearance and personality.

Other educational technics in industry include the so-called "Health Quiz," "Health Information, Please" or "Medical Explanation, Please," patterned on the popular panel discussions of various recent meetings and the radio feature "Information, Please." The Western Electric Company inaugurated a series of such meetings at its Kearny plant in New Jersey in 1940. Sessions cover a half hour at noontime every three or four weeks, particularly during the fall, winter and spring months, when sickness incidence is the highest. The experts consist of a group of four or five physicians chosen from the full time or part time doctors associated with the company, although frequently a "guest" physician may be included in the panel.

Attention should be called to the opportunities which industrial management and workers may have in the use of (a) community services for health education, including those provided by public and private health agencies and local educational institutions, insurance companies and medical societies, and (b) the more recently established health museums, such as the American Museum of Health in New York City and the Cleveland Health Museum in Ohio, which include visual educational material on industrial health.

The American Medical Association maintains an active Bureau of Health Education at its headquarters in Chicago. This bureau has prepared and made available (a) booklets and leaflets on various subjects in the field of adult hygiene and (b) pamphlets and technics in health education, such as radio speakers' bureaus, meetings and newspaper columns. It already has supplied some of the larger industrial organizations with thousands of copies of health posters and inserts to be used in employee magazines. The Bureau of Health Education and the Council on Industrial Health are cooperating in various ways and are now formulating a joint plan for making radio talks available on timely subjects in the field of industrial health. *Hygeia*, the popular monthly health magazine edited and published by the American Medical Association, is an excellent means for health education in industry.

Measurement of results is certain to be quite difficult of application to industrial groups. The Metropolitan Life Insurance Company, after more than thirty years of experience, has come to the conclusion that its health education results are both measurable and favorable. It may be none too early for business executives, plant supervisors and industrial medical and nursing personnel to set up cooperative plans for the final evaluation of their health education programs in terms of goal-attaining results.

DISCUSSION

DR. ANTHONY J. LANZA, New York: At the present time an active movement is on foot to set up first aid courses for employees. There is an excellent opportunity for combining with this first aid instruction other matters concerned with health education and, particularly, important aspects of personal hygiene and nutrition.

DR. FRED J. WAMPLER, Richmond, Va.: One important industry near Richmond has incorporated a health education program with safety education. As a result the absenteeism record for this one plant of nearly four thousand people has been reduced 50 per cent in two years.

Débridement, Suturing and Chemotherapy

DR. EDWARD L. HOWES, New York: This discussion will be limited to the treatment of the acute traumatic wounds, because this is the type seen by the industrial surgeon.

Antiseptics have generally been abandoned. Neither antiseptics nor irrigations remove or destroy bacteria ground into the tissues or the associated foreign bodies or the contused tissue on which 95 per cent of the bacteria grow.

Débridement is the only therapy which will remove this contused tissue containing the foreign bodies and the bacteria. Chemotherapy will not do it. Moreover, débridement should be done regardless of whether the wound is to be sutured or not. After the débridement the edges of the wound may be sutured, if they can be approximated without tension. As little suture material as possible should be employed and no drainage.

Neither muscle nor fat has any ability to hold sutures, so that they need not be sutured. Fascias and septums have a capacity to hold them and therefore should be sutured. The wound repaired in this manner needs a splint and elevation of the wounded part. The result is optimal healing in a satisfactory percentage of cases.

In industrial surgery Overton has reported an incidence of infection of only 0.85 per cent in the treatment of two hundred and forty-seven consecutive wounds treated by débridement and primary suture. The percentage of infection in clean operative wounds at Presbyterian Hospital, New York City, has never been lower than 1.4.

Neither from the standpoint of result nor from the point of view of the reactions of the tissue does there seem to be any indication to use sulfonamide derivatives locally in wounds properly treated by débridement and primary suture. The crystals of these drugs are foreign bodies. Allen and Mason have shown that they cause hemorrhage and gelatinization around sutured tendons. Jenkins has found that they cause almost as much leukocytic infiltration into sutured tissues as implanted feces. Sulfonamides should be used locally when the surgery is inadequate, precarious or dangerously late.

Chemotherapy started by mouth just after the wound is repaired is invaluable. It is needed for massive wounds, for those about the face where cavernosinus thrombosis is to be feared, for the wound of the scalp with the undepressed fracture line beneath, for the wound of the intestine, for the laceration of the face compounded into a frontal sinus, for the compound fracture and for many others.

There is every reason to use sulfonamides locally when the wound is left open. Open wounds must resist bacterial invasion over a longer period of time than sutured wounds.

Immobilization in plaster casts should be used in extensive wounds in civil practice, although its general adoption will never be as widespread as in war surgery.

The Field of Industrial Ophthalmology

This report by the Committee on Industrial Ophthalmology, Section on Ophthalmology, American Medical Association, Dr. Albert C. Snell, chairman, appears in full in this issue, page 610.

Placement of the Industrial Employee

JOSEPH TIFFIN, PH.D., Lafayette, Ind.: It is well known to every plant manager that it is much easier to obtain machines that are equal in efficiency than to obtain employees who are equal in their ability either to operate the machines or to learn to operate them. Employees vary from those who produce only 65 per cent of average production (i. e. 35 per cent less than

average) to those producing 140 per cent of average production. This means that there is a ratio of more than 2 to 1 between the production of the best and the poorest employees. One of the major problems of the modern personnel or employment manager is to hire for each job employees who are most likely to achieve the higher levels of production on that particular job.

The personal differences which account for these differences in production cannot all be accounted for in terms of standard procedures of checking the applicants. Rather, the differences are essentially due to differences in aptitude for the different jobs, and aptitudes vary from one applicant to another, even among applicants who are entirely qualified from the physical or medical point of view.

The evidence is growing more and more that certain test procedures when used as a supplement to the procedures now in use will still further increase the effectiveness of employee placement in industry. Examples of this work might also be taken from the field of paper and pencil testing, sometimes called mental testing or intelligence testing. We proceed by determining whether a certain paper and pencil test succeeds in selecting employees for certain jobs who are more adapted to that job than would have been the case if the employees had been otherwise selected.

About two years ago we began a series of experiments in which were analyzed tests of the visual performance and ability on the job of approximately fifteen thousand industrial employees engaged in a variety of industrial jobs. Various measurements of the job performance ability were obtained in order to find out whether the employees with good vision were producing more on the job or for other reasons were more desirable employees than those with poor vision, and, if so, which particular vision tests were most accurate in picking the satisfactory employees. In some cases the performance of the employees on the job was represented by production records. Accident records were obtained to determine whether or not there was any relationship between the frequency or severity of accidents and the visual performance of the employees.

In the analysis of the data gathered it became apparent that no single visual test is adequate for the placement of employees and that reliance on a single test may in some cases do more harm than good. In one survey it was found that one can make no prediction at all of the acuity of a person at 16 inches after he has been tested at 20 feet. Nor can one predict anything about a person's acuity at 20 feet after he has been tested at 16 inches. The general conclusion in the light of these correlations is that one cannot select the best adapted employees for a 16 inch work distance using only an acuity test given at distance. The solution to this problem probably lies not in the abandonment of acuity testing but in the standardization of testing procedures at distances which are related to productivity on the job.

Having determined that color vision may appear in greater or lesser degree, we analyzed the data to determine what changes, if any, in color vision occur with increasing age. Color vision decreases steadily with age. Seventy-five per cent of the employees between the ages of 20 and 25 were able to pass the four item test; only 30 per cent of employees above the age of 55 retained this degree of ability to discriminate colors.

The implication of these results for the field of industrial allocation of trainees is great. Consider, for example, the case of a color pressman in a printing industry. This job requires approximately ten years of training for expert performance. New men are ordinarily selected for training at ages from 20 to 25, thus reaching their full level of productive efficiency at ages from 30 to 35, with their most productive years as trained operators between the ages of 35 and 50. But in the normal course of growing old most, if not all, of them are going to lose some of the ability to discriminate colors which they had when the training began. It is very important, both to the employees and to the company which is standing the expense of their training, to be sure that training is given only to men who not only have enough color discrimination successfully to learn the job but also have enough surplus of this ability so that after losing some of it with age they will still have a sufficient amount left to perform the job.

Working in collaboration with Dr. Kuhn, we began a series of experiments with occupational eye wear patterned after early experimental work of Weston and Adams in England. A number of hosiery workers engaged in an 8 inch job were divided into two groups. For all of the operators in one group Dr. Kuhn prescribed spectacles which, though varying from one individual to another according to the results of a refraction, generally followed the principle of giving from 1 to 2 diopters more plus lens than an orthodox prescription would call for. The experimental group began to gain in production in comparison with the control group until at the end of the twenty-six week experimental period the experimental group was producing 104 per cent of the production of the control group. Apparently the use of plus lenses which relieve the strain of continuous accommodation required by the job was of sufficient help to the employees in this group to enable them not only to catch up with but to exceed the production of the employees who did not have this advantage.

JANUARY 13—AFTERNOON

DR. ROBERT T. LEGGE, Berkeley, Calif., in the Chair

Conservation of Hearing in Industry

C. C. BUNCH, Ph.D., Evanston, Ill.: This article appears in full in this issue, page 588.

Recent Trends in Physical Examinations Under Civil Service

DR. VERNE K. HARVEY, Washington, D. C.: This article appears in full in this issue, page 597.

Indiscriminate Administration of Vitamins to Workers in Industry

This report, prepared by representatives of the Council on Foods and Nutrition and the Council on Industrial Health, appears as a combined council report in this issue, page 618.

DISCUSSION

DR. GEORGE R. COWGILL, New Haven, Conn.: This report makes it clear that there is no objection to the administration of vitamins to employees under special circumstances when the need has been carefully studied and scientific data exist to support such a practice. The Committee on Nutrition of the National Research Council is preparing a more extensive discussion of this whole problem, but in respect to the widespread administration of vitamins in industry its attitude is exactly the same as reported to this congress. More emphasis is needed to educate the people about food values and the selection of a good diet. The Office of Nutrition in Washington has expanded a great deal in this direction. Various nutrition committees have been established in the states, and sound experience and programs which have proved practical in one locality are relayed to every other state unit. These nutrition committees have been made a part of the state councils of defense, a very desirable arrangement, since questions having to do with food and nutrition are automatically referred for proper consideration. In this way numerous suggestions are also received from medical societies, industries and other groups represented on each defense council. Every type of organization in the community will be used to train people how to provide a good diet. Industrial plants can contribute in an important way to this educational program. Posters are being developed for display in cafeterias and workrooms. But education of the worker alone is insufficient. His wife decides what food will go into his lunch basket and what food will be served in his household. It is necessary, therefore, to arrange to train the wives of workers through attendance at nutrition classes and by the use of literature and posters of all kinds. Suitable inserts can be handed out with pay envelopes, although in some plants adoption of this plan is likely to lead to the suggestion that the worker's pay be increased to provide better food. The information contained in this report must be brought to the plant managers. If we can educate every one about food values, vitamin dispensing will simmer down to use in the treatment of recognized nutritional deficiencies. If we can educate workers and housewives to select a good diet,

we shall be able to support proposals suggesting that the American people cut down on the use of certain foods and eat more of other types in order to release material for shipment to allied countries. If the average citizen understands what is involved, we shall get full support in our program.

MRS. MARY R. DANGREMOND, Chicago: In face of all evidence presented, why are the Army and Navy considering vitamin capsules?

DR. J. S. McLESTER, Birmingham, Ala.: Many soldiers taken into the Army are undernourished. Vitamin preparations will be used to improve the nutritive status of those soldiers for short periods. Also there are times when a soldier cannot get a well balanced diet. When he is living on emergency rations it is well to supplement his diet. There are times when much depends on the accuracy of a soldier's, aviator's or sailor's vision, whether or not he has the full requirement of vitamin A.

DR. W. G. THUSS, Birmingham, Ala.: Is there any evidence to show that the practice of giving vitamin preparations to bus drivers relieves night blindness?

DR. McLESTER: If the driver is already well nourished there is no advantage in giving him vitamins. It is much better that he be assured of an adequate diet.

Medical Service Plans for Small Industries

DR. MYER S. BLOOM, Binghamton, N. Y.: In previous articles in THE JOURNAL OF THE AMERICAN MEDICAL ASSOCIATION I have discussed the development and operation of a plan for freedom of choice of physicians in industry. The details of this plan have now been in operation for ten years. The plan has demonstrated the feasibility of giving the worker complete freedom in the selection of his physician. It was pointed out that this method was susceptible of being extended among diversified industrial organizations at a very reasonable cost. Efficient, adequate medical and surgical care to the satisfaction of patient and physician alike are provided under the mutual benefit associations.

My experiences as medical director at the Dunn and McCarthy shoe factory, extending over a period of twenty-five years, pointed the way to working out the various other mutual benefit associations. The total average annual cost per member for medical services at the Dunn and McCarthy shoe factory during nineteen years was \$17.05 for an almost complete medical coverage. At present every employee of Dunn and McCarthy is eligible to membership after having worked for the company one month. Members must actually pay dues for a period of two months before they are entitled to any benefits, six months to be eligible for hospitalization and operation, eye examinations, x-ray and extraction of teeth and one year before receiving sick benefits when operated on. Benefits are paid in case of illness, quarantine or accidents occurring outside the factory beginning with the second full week of illness. In case of accidents which occur in the factory, benefits are paid for only the first week of disability. No member can draw more than ten weeks' sick benefits in any one year, and not more than \$350 can be spent on any member in one year.

Following our success at the Dunn and McCarthy plant, associations were set up at the Agfa Ansco Division of the General Aniline and Film Corporation, Cary and Company (manufacturers of children's clothing), Spaulding Bakeries Incorporated, Truitt Brothers (shoe manufacturers), the Binghamton Die and Machine Company, the Ozalid Products Division of the General Aniline and Film Corporation and the Gotham Shoe Manufacturing Company.

It was with the Spaulding association that we elected to try a new departure in industrial medicine by giving the employees the privilege of choosing their own physicians. This new system was successful at Spaulding's Binghamton plant. It was then extended to the Elmira and Oneonta plants in 1934, the Wilkes-Barre, Pa., plant in 1935 and the Middletown plant in 1936. I believe that when the Spaulding employees were allowed complete freedom in the choice of their physicians this was the first time such privilege had been granted by any organization.

In each of the Spaulding mutual benefit associations (Binghamton, Elmira, Oneonta, Wilkes-Barre and Middletown) the setup is essentially the same. Major and minor operations, eye examinations, hospitalization for thirty days a year at \$3 a day,

house and office calls (limited to \$50 a year) and x-ray and extraction of teeth (limited to \$25 a year) are allowed. Not more than \$350 can be spent in one year on a member.

Our experience indicates that with proper administration and with cooperation between the benefit associations and the local medical societies this type of service to the worker can be provided in industry on a basis of complete freedom of choice of physicians. Successful development of such mutual benefit associations depends to a large extent on low overhead, anticipation of costs and the ratio of male and female employees in the industry concerned. These plans have been in successful operation for a sufficient number of years to prove their feasibility and financial soundness.

DISCUSSION

DR. KINGSLEY ROBERTS, New York: I should like to ask if any formal agreement was made with the local county medical societies about acceptance of this plan before it was very far under way?

DR. MYER S. BLOOM, Binghamton, N. Y.: I originally set those fees a good many years ago after discussion with some of the leading doctors at that time. All did not agree in the beginning and some were not particularly interested in doing industrial work. However, any employee who wanted to go to these doctors would receive his allowance. The difference they would have to make up themselves. We notified employees

about extra charges. In Broome County we have approximately two hundred doctors, one hundred and eighty-eight of whom are members of the county medical society. During a four year period at the Binghamton plant of the Spaulding Bakery one hundred and seventy-two doctors in the county were paid, eighteen of whom lived outside the city. At Agfa Ansco, during the year 1940, we employed one hundred and thirty-six doctors in the city and thirty-eight from surrounding towns. We paid doctors' bills in fifty-two cities and fifteen states. We naturally have no control over the physicians outside the city, and when a receipted bill for doctor's services or hospitalization was presented we paid whatever would have been allowed in our own local community.

ATLANTIC CITY SESSION

Alumni and Fraternity Luncheons

Officers of medical alumni associations, medical fraternities and other groups who wish to have luncheons, dinners or banquets at the time of the annual session of the Association in Atlantic City, June 8 to 12, are urged to communicate with Dr. Daniel C. Reyner, 2703 Pacific Avenue, Atlantic City, N. J., the chairman of the Subcommittee on Alumni and Fraternity Reunions of the Local Committee on Arrangements.

MEDICAL ECONOMIC ABSTRACTS

MICHIGAN MEDICAL SERVICE

On Nov. 30, 1941 the enrolment of the Michigan Medical Service had reached 450,000. This makes the Michigan Medical Service the largest voluntary medical service plan in the world. "This expansion," says the *Journal of the Michigan State Medical Society* of January, "has been necessary to assure a cross section for average experience but has also meant a number of problems which are gradually being solved." February 28 will mark the completion of the second year of operation. During the first year \$200,000 was paid to doctors of medicine for services to subscribers. During the second year this payment will exceed \$1,000,000. Since October 1941 100 per cent of the schedule of benefits has been paid. In three counties 100 per cent of the physicians are enrolled and in thirty-six additional counties 80 per cent or more have accepted services under the plan.

The rapid growth of the Michigan Medical Service in recent months has somewhat intensified the inevitable difficulties of any extensive and rapidly growing prepayment plan for medical care. This is a voluntary organization, operated by the Michigan State Medical Society. Disagreements and difficulties are not settled by autocratic edicts and regulations but by the democratic process of a referendum of the medical society membership. The referendum was initiated and confined to the membership of Wayne County (Detroit) but probably gives a fairly accurate picture of the extent of approval of and dissatisfaction with certain controversial features of the plan.

There were 962 returns, of which 686 were from surgeons and therefore especially concerned with the operation of the section of the plan having the widest scope. Of those voting, 733 were participating in the operation of the plan, 215 were nonparticipating and 60 were not in practice. Of the participating members, 48, or about 7 per cent, expressed general dissatisfaction, while 25, or about 11 per cent of the nonparticipating voters, were dissatisfied.

Several of the questions asked for opinions on specific points and the replies were suggestive in determining the professional attitude toward a number of features of prepayment plans. The fact that 10 to 20 per cent of those replying to the questionnaire had not fully understood the provisions for additional payments by patients in the higher income classes in excess of those paid by the plan or for additional payments for certain special services not covered by prepayment would seem to indicate either inadequate educational work or indifference by physicians to the

provisions of the plan adopted by their own organization. That nearly 70 per cent answered "no" to the question "Are you satisfied with the present plan as applied at present?" probably indicates the need for some revision. One direction of the revision may be shown by the majority vote in "favor of a plan which incorporated cash indemnity or limited liability insurance."

There was almost an even vote on the questions of whether the present schedule for the low income group, if paid 100 per cent, is proper. Nearly one half voted that it was "too low." There was a decided majority against raising the income limit and considerable opposition to such a change even if those to be included above the income limit receive the regular payments of the plan only as a credit. Five hundred and three thought the income limits at present were proper but 295 thought they were too high. Perhaps an explanation of at least a part of this attitude is found in the fact that more than 50 per cent said that they had difficulty in collecting additional fees under the conditions proposed. There were some further implied criticisms of the administration in the answers to other questions, but nevertheless almost 80 per cent said that in view of recent changes of the administration they were "willing to cooperate in this plan for a period of six months if payments are returned to 100 per cent of the fee schedules."

WAR MARRIAGES

It is not the draft but the increase of employment in industry that is swelling the marriage statistics, according to the statisticians of the Metropolitan Life Insurance Company. During January and November 1941, marriage licenses increased 9 per cent over the same months of 1940 in thirty large American cities for a fourth of the nation's population; they increased from 30 to 40 per cent in the cities where defense production was the highest. In Baltimore and in Dayton, Ohio, centers of war industrial activity, the increase was almost 40 per cent. Other cities where war has multiplied industrial production and which showed increases were Indianapolis with an increase of 30 per cent, Hartford, Conn., 20 per cent, Providence, R. I., 23 per cent, and Worcester, Mass., 20 per cent. Increased employment in Washington was accompanied by one-third more marriage licenses in the first eleven months of 1941 than in the corresponding months of 1940. On the other hand, gains in the six largest cities of the country were less striking. In New York the increase was only 2.5 per cent, in Chicago 6 per cent, in Philadelphia 3.5 per cent, in Detroit 5.5 per cent, in Los Angeles 10 per cent and in Cleveland 2.25 per cent.

REPORT OF CALIFORNIA PHYSICIANS' SERVICE

In its report for July 1941, California Physicians' Service analyzed the number of office, home and hospital calls made by patients and doctors. Such statistics vary according to several human elements. Some physicians see patients more often than is necessary for minor ailments or carry the chronic case with frequent visits over a long period of time. Rural, urban and metropolitan areas differ as do the general practitioner and the

Visits During January to July 1941

Month	Members	Total Visits	Visits per Thousand Members
January	21,936	12,327	562
February	22,948	12,163	530
March	24,107	14,497	602
April	24,500	13,584	553
May	27,057	13,394	495
June	27,632	13,763	498
July	28,518	13,137	460

specialist. The use of such substances as thiamine and hormone derivatives varies extremely. Some use hypodermic and others prefer oral medication.

A simple way of calculating an index of the number of monthly visits is by the number of visits per thousand of beneficiary members. It is found that there are wide seasonal variations in this figure, as is shown by the table for the first seven months of 1941.

OREGON PHYSICIANS SERVICE BUREAU

The council of the Oregon State Medical Society at a meeting on Nov. 8, 1941 discussed and approved the incorporation of an Oregon Physicians Service Bureau. This bureau is a central organization under control of the state medical society and will offer medical and hospital and related services in districts not now serviced through the Bureau of Medical Economics. This fills a long-felt need for large districts, where the physicians are too far apart to organize and operate properly their own bureau. It does not supersede the existing service bureaus and in no way interferes with their operations. It does create a central agency for writing statewide contracts which can subsequently be turned over to local bureaus for contract fulfillment.

This plan permits contracts to be made with such agencies as the Farm Security Administration on a uniform statewide basis. Such a project is being proposed with the Farm Security Administration in which there will be definite limitations, and initial rates will be subject to future changes as experience determines. Other federal and state agencies may be able to find a solution for their medical service problems in such an organization.

The Multnomah County Medical Society decided to gather some experience on family coverage in a higher income bracket by granting approval to the Multnomah Medical Service Bureau of its proposed contract with the postal employees and their spouses (not including their children).

WOMAN'S AUXILIARY

District of Columbia

The woman's auxiliary to the District medical society held its first meeting of the year in the medical society's building, with the new president, Mrs. Caryl Burbank, presiding. Dr. Henry R. Schreiber, president of the Medical Society of the District of Columbia, talked. Mrs. Ernest E. Hadley reported that sixteen new members had been added to the roster so far this year.

Mississippi

Mrs. H. K. Rouse, new president of the auxiliary to the Coast Counties Medical Society, was hostess for the first meeting of the new club year. Red Cross hospital surgical gowns to be cut and made by the members were distributed. Mrs. C. H. McCall was appointed chairman of this project.

Mrs. D. L. Hollis was elected president of the Biloxi unit of the Coast Counties auxiliary at a recent meeting.

Missouri

The Women's Auxiliary to the Missouri State Medical Association is sponsoring an essay contest among high school students again this year. Any high school student in Missouri may participate. The subject chosen is "Nutrition for Defense." Mrs. Frank L. Davis, 6123 Westminster Place, St. Louis, is essay contest chairman.

Oregon

A meeting of the auxiliary to the Polk-Yamhill-Marion County Medical Society was held in the home of Mrs. H. J. Clement, with twenty members present. Mrs. Baum, the president, reported that members had contributed \$49.50 toward the Hygeia Fund. The auxiliary voted to contribute to the state fund and \$1 toward the McLoughlin House chair, a project of the state auxiliary. Miss Isabel Gates spoke on work being done in the bean and hop yards in the way of Christian education for the children whose parents follow the crops.

A recent meeting was held in the home of Mrs. Carl Emmons, with thirty-three members attending. Mrs. Thelma Mitchell spoke on "Nutrition as a Factor in Civilian Defense." Dr. Ralph Purvine spoke to the group on disaster relief.

The study group of the Multnomah County medical auxiliary met at the home of Mrs. Laurence R. Serrurier recently. A movie reel was shown at Morningside Hospital for the Alaskan

Insane on the insulin and metrazol treatment for dementia precox. A clinic was also given by Drs. John Haskins and Laurence R. Serrurier. The study group met also at the home of Mrs. F. H. Damasch. Mrs. Charles H. Manlove, president of the auxiliary, gave a book review on "You Can't Do Business with Hitler." The auxiliary met recently and discussed the subject "Our Part in National Defense." Miss Elizabeth Baldwin, member of the state nutrition committee, spoke on "Spend-ing the Dollar According to the New Nutrition Standard."

Texas

The Liberty-Chambers Counties auxiliary met, recently, at the home of Mrs. Frank S. Griffin Jr., Liberty. The following were elected: Mrs. A. R. Shearer, Mont Belvieu, president; Mrs. W. H. Bridges, Mont Belvieu, secretary-treasurer, and Mrs. E. R. Richter, Dayton, parliamentarian. Mrs. Jack Bevil was elected vice president and president-elect. The auxiliary voted to continue a \$2 contribution of each member to the memorial, student loan and George Plunkett Red funds of the state auxiliary.

The Wichita County auxiliary met at Wichita Falls with Mrs. S. F. Harrington, Dallas, president of the state auxiliary, as guest speaker. Mrs. M. H. Glover, president, introduced Mrs. Harrington, who spoke on "The Doctor's Wife in National Defense."

The Tarrant County auxiliary was entertained, recently, at the home of Mrs. X. R. Hyde, Fort Worth, honoring the president, Mrs. E. L. Howard. Seventy-five members of the auxiliary were present.

The Jefferson County auxiliary met, recently, in Beaumont. Dr. H. F. Ford, assistant professor of neurology and psychiatry, University of Texas Medical School, Galveston, spoke on "Mental Health—a Defense Measure."

The Lamar County auxiliary met, recently, at the home of Mrs. W. W. Fitzpatrick, Paris, with fourteen members present. The auxiliary voted to sponsor a health essay contest in rural schools and in the Paris High School.

The Tom Green Eight Counties auxiliary held a business session, recently, at San Angelo. Mrs. Carl A. Kunath, San Angelo, treasurer, reported that the auxiliary realized \$25 from its recent rummage sale.

Medical News

(PHYSICIANS WILL CONFER A FAVOR BY SENDING FOR THIS DEPARTMENT ITEMS OF NEWS OF MORE OR LESS GENERAL INTEREST: SUCH AS RELATE TO SOCIETY ACTIVITIES, NEW HOSPITALS, EDUCATION AND PUBLIC HEALTH.)

CALIFORNIA

Examination for Resident Physicians.—The Los Angeles County Civil Service Commission has announced an examination for resident physicians at the Los Angeles County Hospital. Residencies are available in the following services: dermatology and syphilology, orthopedic surgery, otorhinolaryngology, pathology and pediatrics. Applicants between 21 and 40 years of age who have graduated with an M.D. degree from an approved medical school and have completed at least one year of internship in an approved hospital may file for the examination. Candidates must possess or be able to secure a physician and surgeon certificate to practice in California. County residence is not required and there is no written examination. Applications must be filed in room 102, Hall of Records, by March 3.

Society News.—The San Francisco County Medical Society devoted its meeting, February 10, to a symposium on nutrition; the speakers were Dr. Dwight L. Wilbur, San Francisco; Agnes Fay Morgan, Ph.D., professor of home economics, University of California, Berkeley; James Murray Luck, Ph.D., associate professor of biochemistry, Stanford University at Stanford University; Nina Simmonds, Sc.D., lecturer in medicine at the University of California Medical School, San Francisco, and Dr. Arthur L. Bloomfield, San Francisco. —The Los Angeles County Medical Association was addressed, January 15, by Drs. Ben L. Bryant, Los Angeles, on "Argyria Resulting from Intranasal Medication" and Lawrence K. Gundrum, Los Angeles, "Effect of the Newer Sulfonamides on the Nasal Mucosa of Rabbits." —Dr. Solomon Strouse, Los Angeles, among others, addressed the Los Angeles Heart Association, January 21, on "The Mind and the Emotions of the Patient with Heart Disease." —The Los Angeles Society of Neurology and Psychiatry was addressed, January 21, by Drs. May E. G. Romm, Beverly Hills, on "Emotional Problems in Adolescence" and Frank M. Anderson, Los Angeles, on "Acoustic Neuroma Within the Petrous Bone: Operative Removal." —Dr. Lester B. Lawrence, Oakland, among others, addressed the Alameda County Medical Association in Oakland, January 19, on "Diagnostic Tests for Intracranial Neoplasms."

CONNECTICUT

State Society to Observe One Hundred and Fiftieth Anniversary.—The Connecticut State Medical Society will hold a two day celebration at Wesleyan University, Middletown, June 3-4, to observe the one hundred and fiftieth anniversary of its founding. The first day will be devoted to a consideration of "Present and Future Trends in Medicine" with the following speakers: Mr. James A. Hamilton, director, New Haven Hospital, on "Medicine and the Hospital"; Dr. John L. Rice, health commissioner of New York City, "Medicine and Public Opinion"; Michael M. Davis, Ph.D., New York, "Medical Care and Its Distribution," and Mr. Thomas A. Hendricks, executive secretary of the Indiana State Medical Association, Indianapolis, "Medicine and the Public Knowledge." On the second day the speakers will include:

Governor Robert A. Hurlay, Greetings from the State of Connecticut.
President James L. McConaughy, LL.D., of Wesleyan University.
The Mayor of Middletown.
Dr. Howard W. Haggard, New Haven, Connecticut Colonial Medicine.
Dr. Creighton Barker, New Haven, The Connecticut State Medical Society from Its Founding in 1860.
Dr. Stanley B. Weld, Hartford, The Connecticut State Medical Society from 1860 to the Present.

Dr. Fred W. Rankin, Lexington, Ky., President-Elect of the American Medical Association, will deliver the oration of the day and Dr. Logan Clendening, Kansas City, Mo., at the anniversary dinner will be the orator of the evening. To commemorate the anniversary, the state society plans to publish in book form writings by invited authors on the development of medicine in Connecticut, the volume to be entitled "The Heritage of Connecticut Medicine," a special issue of its state journal and a brochure for the general public dealing with medical and health matters of special interest emphasizing what one hundred and fifty years of medical service has done for the public welfare. The press and radio will also be utilized in marking the event and a comprehensive historical exhibit will be a feature at the session in Middletown.

DISTRICT OF COLUMBIA

Society News.—Dr. Reed M. Nesbit, Ann Arbor, addressed the Washington Urological Society, February 18, on "The Value of Cystometry in the Everyday Practice of Surgery and Medicine." —The Medical Society of the District of Columbia will be addressed, February 25, by Dr. Fuller Albright, Boston, on "Ovarian Deficiencies and Their Treatment."

Five Typhus Carrier Rats Trapped.—The District health department has reported that tests on the rats trapped in the Union Station area, Washington, have shown 5 to be carriers of endemic typhus. According to the Washington *Evening Star*, January 22, a house committee has been appointed to investigate rodent control in the District. At a meeting of this committee Dr. George C. Ruhland, health officer, stated that 5,000 rats had been captured in a recent rat eradication campaign.

Course in Psychiatry and Neurology.—The departments of psychiatry and neurology of the George Washington University School of Medicine opened a postgraduate course in psychiatry and neurology, January 30, to continue through May 16. Lectures, laboratory and clinical demonstrations comprise the course which is being conducted at the medical school and at Gallinger Municipal and St. Elizabeths hospitals. The subjects include the anatomy, physiology and pathology of the nervous system, clinical neurology, neurosurgery, electroencephalography, diagnostic roentgenology, clinical psychiatry, the psychoneuroses, military psychiatry and neurology, child psychiatry, forensic and administrative psychiatry, psychosomatic medicine, psychobiology and psychopathology.

ILLINOIS

Society News.—Dr. James H. Mitchell, Chicago, addressed the Sangamon County Medical Society in Springfield, February 5, on "Differential Diagnosis and Treatment of Dermatoses of the Hands and Feet." —The Adams County Medical Society was addressed in Quincy, February 10, by Dr. Chauncey C. Maher, Chicago, on "Management of Patients with Coronary Artery Disease." —Dr. William M. James, St. Louis, discussed "Diagnosis and Treatment of the More Common Eye Disorders" before the Madison County Medical Society in Granite City, January 2.

New State Criminologist.—Dr. Roy G. Barrick, Joliet, assistant to the state criminologist and superintendent of the diagnostic depot, Illinois State Penitentiary, has been appointed state criminologist effective February 1. He succeeds Dr. Paul L. Schroeder, Chicago, who asked to be relieved so that he could devote full time to directing the Institute for Juvenile Research and to his teaching as professor of psychiatry and head of the department of criminology at the University of Illinois College of Medicine.

Chicago

Society News.—Dr. Clayton G. Loosli addressed the Society of Illinois Bacteriologists, February 20, on "Production of Experimental Influenza in Mice by Means of Exposure to Air Borne Virus and Its Prevention by Propylene Glycol Vapor" and Major Hugh R. Gilmore Jr., Sixth Corps Area Laboratory, Fort Sheridan, "Preventive Medicine in the Army." —Dr. Carey P. McCord, Detroit, addressed the Chicago Society of Industrial Medicine and Surgery, February 2, on "New Industrial Medical Problems Created by Present Emergencies." —Dr. Phillips Thygeson, New York, addressed the Chicago Ophthalmological Society, January 19, on "Diagnosis and Treatment of Conjunctivitis." —The Chicago Pediatric Society was addressed, January 20, among others, by Dr. Douglas N. Buchanan on "Behavior in Organic Disease." —The Illinois Psychiatric Society was addressed, February 5, by Drs. Jacques S. Gottlieb, Iowa City, on "The Effect of Benzedrine Sulfate on Migraine" and Joan Fleming, "Observations on the Use of Chess in the Therapy of an Adolescent Boy."

New Wesley Hospital Opened.—Special ceremonies recently marked the opening of the new Wesley Memorial Hospital at Chicago Avenue, Superior Street and Fairbanks Court. Ernest Lynn Waldorf, D.D., resident bishop of Chicago, presided and Ernest Fremont Tittle, D.D., pastor of the First Methodist Church of Evanston, delivered the dedicatory address, on "Religion and Health." Dr. Raymond W. McNealy, superintendent of the hospital, made the presentation speech. A portrait of the late Mr. Eugene S. Gilmore, who served as superintendent of the old Wesley from 1908 to 1931 was unveiled in the board room. George Herbert Jones in 1937 gave about \$2,000,000 in stock to finance the new hospital, which is planned as the first unit in a group of buildings to

be known as the George Herbert Jones Hospital Center. It is twenty stories high with a capacity of five hundred and twenty-five beds. The new hospital is affiliated with and adjacent to Northwestern University Medical School.

Latin American Physiologist to Give Hamburger Lecture.—Dr. Eduardo Braun-Menendez, director of cardiovascular investigations and lecturer in physiology, Faculty of Medical Sciences, University of Buenos Aires, Buenos Aires, Argentina, will deliver the first Walter Wile Hamburger Memorial Lecture of the Institute of Medicine of Chicago, March 3, in the Rothschild Auditorium of Michael Reese Hospital. His subject will be "The Mechanism of Renal Hypertension." This lecture marks the first activity under a special fund established by the board of governors of the Institute of Medicine in honor of Dr. Hamburger. The fund was originally intended as a gift to be presented on his sixtieth birthday in September 1941. Dr. Hamburger died on June 27, 1941. The fund was then designated as a memorial in his honor, the income to be used for the endowment of lectureships and scholarships or to finance any medical activity of the institute. Contributions are still being accepted. Dr. Hamburger was clinical professor of medicine, University of Chicago School of Medicine. He was also a member of the executive committee of the board of governors of the institute.

INDIANA

New Blood Bank.—The Lake County Medical Society has established a blood bank at St. Mary's Mercy Hospital, Gary, with storage facilities for about 1,000 pints of blood plasma, available for all the hospitals in the county. Excess plasma over the normal local requirements will be forwarded to the American Red Cross.

License Revoked for Practicing with Chiropractor.—The license of Dr. Robert B. McAlpin, Greenwood, was revoked recently on the charge of "gross immorality" in that he aided and abetted fraud by practicing with Heil E. Crum, chiropractor, lending his medical license in the illegal and fraudulent practice carried on by Crum with the use of the so-called "coetherator," according to the state board of medical examiners. THE JOURNAL (Dec. 6, 1941, p. 1992) reported that Crum employed a contrivance called an "etherator" or "coetherator" which was totally devoid of any therapeutic value. It was said to be a small wooden box with a number of holes in the front over which various colors of thin paper were pasted. On the inside was an ordinary light bulb with a cord for making contact with electricity. The bulb could be moved about so that the light would penetrate the various paper covered holes. The box contained a disconnected wire and a glass tube filled with hydrant water. There was a pedal and a dial on the outside of the box, neither of which had any connection with the interior. The patient would moisten a slip of paper with saliva and deposit it through a slot on the top of the box. Crum would rub the pedal with his thumb and repeat the popular names of diseases and organs of the body. The diseases which he claimed to be able to treat and relieve, and in some instances cure, were cancer, blindness, arthritis, nervous disorders, hemorrhoids, abscesses, kidney ailments, stomach disorders, leakage of the heart, skin ailments, ovarian trouble, varicose veins and tumors. Crum further claimed that he could lengthen or shorten a patient's legs, cause amputated fingers to grow back into place and restore teeth to their original condition. He said that it was not necessary for patients to be present or visit his office but that he could broadcast treatments to them wherever they might be located. The action of the state board of medical registration and examination in revoking Crum's license to practice chiropractic, naturopathy and electrotherapeutics was upheld by the Circuit Court and later by the Supreme Court. Dr. McAlpin graduated at the Medical College of Indiana, Indianapolis, in 1902 and was licensed to practice in Indiana the same year.

KENTUCKY

Society News.—Dr. Alfred M. Glazer, Cincinnati, discussed "Plasma Transfusions and Their Indications" before the Campbell-Kenton County Medical Society in Dayton recently. —The Four County Medical Society was addressed recently by Drs. Charles H. Maguire and Lawrence T. Minish Jr., Louisville, on "Early Diagnosis of Gastrointestinal Malignancies" and "Pneumonia and Sulfonamide Therapy," respectively.

Jane Todd Crawford Memorial.—Plans are under way to construct a log cabin on the site of the former Crawford home, to be designated the Jane Todd Crawford Memorial. The Greensburg Woman's Club has secured a deed to a plot of ground on the farm with a road leading to it from the highway known as the Jane Todd Crawford Trail. This high-

way leads from the Crawford farm in Green County to the McDowell home in Danville and was named by the state highway department. A replica of the Crawford log cabin on the farm will be erected with used logs, the Works Progress Administration to furnish the labor. When the cabin is completed, an appeal will be made for funds to purchase furniture and finance the landscaping. It is planned to turn the property over to the state park commission.

MAINE

Society News.—Dr. Eugene H. Drake discussed "Syncope" before the Portland Medical Club on November 4. —Dr. Terry M. Townsend, New York, addressed the Kennebec County Medical Association in Waterville, November 13, on "Relief of Prostatic Urinary Retention." —The Penobscot County Medical Association was addressed in Bangor, November 18, on "Dysmenorrhea." Dr. Meyer Saklad, Providence, R. I., discussed "Choice of Anesthesia in General Practice" before the association recently. —The Knox County Medical Society was recently addressed in Rockland by Dr. Francis M. Thurmon, Boston, on "Extragenital Sores."

MASSACHUSETTS

Hospital News.—The Washingtonian Hospital, Boston, has been conducting a series of lectures on the treatment of alcoholism. Two of the lectures were given by Drs. Robert E. Fleming, Boston, on "The A-B-C's of Alcoholism" and Dr. Abraham Myerson, Boston, on "The Treatment of Alcoholic Psychosis."

Evans Memorial Lecture.—Dr. Alfred Blalock, professor of surgery, Johns Hopkins University School of Medicine, Baltimore, gave a lecture in the Robert Dawson Evans Memorial series, January 23, in the Evans Auditorium, Boston. His subject was "Traumatic Shock: A Consideration of Its Pathogenesis and Treatment."

Graduate Courses.—The winter series of postgraduate extension courses, which are conducted throughout the state under the auspices of the state medical society in cooperation with the state department of health and the U. S. Public Health Service, opened in Norwood for the Norfolk District, January 15, with a talk on "Head Colds and Complications." In nearly all cases, each series consists of eight weekly lectures on varied subjects. In addition to Norwood the following centers have been selected: Pittsfield, Fall River, New Bedford, Springfield, Winchester, Quincy, Milford and Fitchburg.

MICHIGAN

The Beaumont Lectures.—The nineteenth annual Beaumont Lectures of the Wayne County Medical Society were delivered at the Art Institute, Detroit, by Dr. Charles C. Higgins, Cleveland, February 2 and 9, on "Renal Lithiasis."

Hospital News.—The new Northwestern Branch of the Grace Hospital, Detroit, was opened on January 28. The new unit is situated on a 10 acre site, has a capacity of one hundred and eighty-seven beds, including thirty-five private rooms and sixteen four bedroom wards, and facilities for sixty bassinets. Dr. Kenneth E. Babcock, assistant director of Grace Hospital, will be in charge of the new unit.

Fifty Years of Practice.—Dr. Clarence P. Lathrop, Hastings, was guest of honor at a dinner given by the Barry County Medical Society, December 4, in recognition of his completion of fifty years in the practice of medicine. He graduated at Chicago Homeopathic Medical College in 1890. He has served as coroner of the county for many terms. —Dr. Lewis E. Cochran, Peck, recently completed fifty years as a medical practitioner.

Society News.—The Eaton County Medical Society was addressed in Charlotte, January 22, by Drs. Milton Shaw and Charles E. Black, Lansing, on "The Value and Technique of Autopsies" and "The Pathologist and the Mortician," respectively. —Dr. Hazel R. Prentice, Kalamazoo, was chosen president-elect of the Michigan Pathological Society at its annual meeting and Dr. Henry E. Cope, Lansing, was installed as president. Dr. Donald C. Beaver, Detroit, is secretary. —Dr. George B. Eusterman, Rochester, Minn., addressed the Wayne County Medical Society, Detroit, January 12, on "Problem of Gastric Carcinoma: Personal Observations on Manifestations of the Disease in Its Earliest Stages." —Dr. Claire L. Straith, Detroit, addressed the Muskegon County Medical Society, January 23, on "Plastic Surgery of the Face." —The Detroit Physiological Society was addressed, January 27, by Dr. Harry P. Smith, Iowa City, on "Problems in Blood Clotting."

NEW JERSEY

Personal.—Dr. Frederick G. Dilger, Hackensack, has been appointed medical director of the Newark office of the New Jersey Rehabilitation Commission, succeeding Dr. Henry H. Kessler, who resigned to enter active duty in the medical corps of the U. S. Navy.

Society News.—Dr. William T. Lemmon, Philadelphia, addressed the Gloucester County Medical Society in Woodbury, January 15, on "Acute Abdominal Emergencies with Their Diagnosis and Treatment."—The Hudson County Medical Society was addressed in Jersey City, February 3, by Dr. Russell L. F. Cecil, New York, on "The Problem of Chronic Joint Disease."—Dr. Arthur W. Allen, Boston, discussed "Gastric Ulceration and Early Cancer of the Stomach" before the Academy of Medicine of Northern New Jersey, January 15.—Dr. Norman H. Plummer, New York, discussed "Use and Misuse of the Sulfonamide Drugs" before the Passaic County Medical Society in Paterson, January 8.

NEW YORK

Cancer Teaching Day.—January 17 was designated "Cancer Teaching Day" at Syracuse University College of Medicine, Syracuse. The program, which was presented under the auspices of the Tumor Clinic Association of the State of New York, the university, the state medical society and the division of cancer control of the state department of health, was devoted to a symposium on the modern knowledge of cancer. The speakers included Drs. Bowman C. Crowell, Chicago, and Byrl R. Kirklin, Rochester, Minn.

Obstetric Consultant Service.—Plans have been announced to establish an obstetric consultant service in the state for patients unable to pay for private consultation. National funds have been made available, to be paid through the state department of health. Consultants will receive the stipulated fee of \$15, including travel. The plan is not intended to interfere with consultation in private practice. It will cover welfare cases, but patients need not have a relief status. The plan also aims to have available consultant service in all areas so that the individual physician needing obstetric consultation for any emergency can get such help from the district health officer, who will have the list of consultants. County medical societies are being asked to provide the subcommittee on maternal welfare of the state medical society with lists of qualified obstetricians who are willing to cooperate in the project. The state department of health will make the final appointments and supply the names to the district health officers.

Typhoid Carriers.—The state health department recently published a report on the first ten years' experience with release specimens for typhoid cases to ascertain the age and sex distribution of an unselected group of carriers. Between Jan. 1, 1930 and Dec. 31, 1939 there occurred 3,750 typhoid cases in New York State, exclusive of New York City and state institutions. Four hundred and thirty-four patients died and 122 others were not followed for a sufficient time to determine whether they were eligible for release or for declaration as chronic carriers. These 556 individuals were excluded from the tabulation, leaving 3,194 cases of typhoid which gave rise to ninety-three chronic carriers. Release is accomplished by meeting the Sanitary Code requirement of having two negative stools with an interval of five days. According to the state health department almost one half of the typhoid cases occur at ages under 20, yet only 5.4 per cent of the carriers come from this age classification. In this group the males outnumbered the females as cases in the ratio of approximately 11 to 9, but females outnumbered the males as carriers in the ratio of 3 to 2. The report points out the fact that almost 15 per cent of women who have typhoid between the ages of 40 and 59 become chronic carriers.

New York City

Fellowship to Honor Dr. Niles.—The creation of a fellowship in honor of the late Walter Lindsay Niles, who at the time of his death on December 22 was acting dean of Cornell University Medical College, has been announced by the University and New York Hospital. An endowment fund of \$100,000 is now being raised to provide annual awards to "outstanding young men entering the medical profession."

Dr. Hetrick Named Dean of New York Medical College.—Dr. J. A. Werner Hetrick, acting dean of the New York Medical College, Flower and Fifth Avenue Hospitals, since March 1941, has been appointed dean of the school, filling the vacancy that occurred on the death of Dr. Claude A. Burrett.

Dr. Hetrick graduated at the school in 1918, joining the faculty in 1921 as a member of the department of otolaryngology. In 1929 he became professor and head of the department of otolaryngology. He was named assistant dean in 1924 and associate dean in 1939. Dr. Hetrick is 46 years of age.

Forum on Venereal Diseases.—The New York branch of the American Association of Scientific Workers on Venereal Disease Problems in the Army and Civilian Defense Areas sponsored a forum at the Men's Faculty Club, Columbia University, January 7. Dr. Ernst P. Boas, assistant clinical professor of medicine of Columbia University College of Physicians and Surgeons, acted as chairman and the speakers were Lieut. Col. Edward H. Marsh, Office of the Surgeon, Second Corps Area, U. S. Army, and Dr. Roger E. Heering, passed assistant surgeon, U. S. Public Health Service, district number 1.

Gold Medal Awarded to Physicist.—Edith H. Quimby, M.A. since 1932 associate physicist at the Memorial Hospital for the Treatment of Cancer and Allied Diseases, was presented with the gold medal of the Radiological Society of North America at its annual meeting in San Francisco in December in recognition of her work on dosage and filtration. Mrs. Quimby, at the annual meeting, presented a paper on "Practical Considerations Regarding the Employment of Various Qualities of Roentgen Rays in Therapy." Mrs. Quimby received her B.S. at Whitman College, Walla Walla, Wash., in 1912 and A.M. at California in 1915. She went to Memorial Hospital in 1932.

Conferences on Health Education.—Dr. John B. Youmans, Nashville, Tenn., gave the first lecture in a series of conferences on the scientific foundation of health education, January 30, on "Nutrition and Health Education." Others in the series are:

Dr. John Romano, Boston, Mental Hygiene, February 26.

Bernhard J. Stern, Ph.D., New York, Sociology, March 25.

Mr. Philip W. Lennen, president of Lennen & Mitchell, Instrumentalities of Education and Propaganda, April 30.

Dr. Perrin H. Long, Baltimore, Hygiene—Public Health, May 28.

The Welfare Council of New York City is sponsoring the lectures which are being given at the New York Academy of Medicine. Additional information may be obtained from Dr. Iago Galdston, 44 East Twenty-Third Street.

Conference on Tuberculosis.—The New York Tuberculosis and Health Association will hold its fortieth annual meeting at the Hotel Pennsylvania, March 2, following its annual conference on tuberculosis, which will be held jointly with the Tuberculosis Sanatorium Conference of Metropolitan New York. Speakers will include:

Dr. Bruce H. Douglas, Detroit, Tuberculosis and National Defense.

Dr. Charles J. Hatfield, Philadelphia, Tuberculosis—Retrospect and Prospect.

Dr. Edward S. McSweeney, Another Year of Tuberculosis Work.

Emil Frankel, Ph.D., director, division of statistics and research, New Jersey State Department of Institutions and Agencies, Trenton, N. J., Problem of Patients Leaving the Sanatorium Against the Advice of the Doctor.

Dr. Esmond R. Long, Philadelphia, Constitution and Tuberculosis.

The program will conclude with a panel discussion on "Problems in Pulmonary Tuberculosis," with Dr. Oswald R. Jones as moderator.

NORTH CAROLINA

Changes in Health Officers.—Dr. Edward S. Grady, Winston-Salem, has been placed in charge of the health unit in Johnston County, succeeding Dr. Will H. Lassiter Jr., Smithfield, resigned. Dr. Grady has been assistant health officer of the unit covering Forsyth, Stokes, Yadkin and Davie counties.

Society News.—The Union County Medical Society was recently addressed by Drs. Francis N. Andrews, Waxhaw, and John W. Ormand, Monroe, on "The Black Widow Spider" and "Clinical Medicine and Physiology" respectively.—At a joint meeting of the Mecklenburg County Medical Society and the North Carolina Radiological Society recently Dr. Ross Golden, New York, among others, spoke on "Diagnosis of Disease of the Small Bowel."

Personal.—Dr. Charles H. Pugh, Gastonia, was recently presented with a special scroll by chapter 66, Royal Arch Masons, in recognition of his many services in the order. Dr. Pugh, who is Grand High Priest, at one time served as secretary of the Gaston County Medical Society. He also served as president of the Seventh District Medical Society, of which he has been secretary for the last eleven years. He is also on the staff of the City Hospital and chief of staff of the Gaston County Negro Hospital of Gastonia, it is reported.

OKLAHOMA

New Two Year Program on Internal Medicine.—The state medical journal announces plans to begin a two year program of graduate lectures on internal medicine, with the financial assistance of the Commonwealth Fund of New York. A similar series on pediatrics was concluded in January with Dr. James G. Hughes, Oklahoma City, as the instructor. The Commonwealth Fund and the state department of health also cooperated in financing this course, which was arranged by the committee on postgraduate education of the state department of health. Nine circuits covered various teaching centers throughout the state; there were seven hundred and eighty-two enrollees, nine hundred and seventy-nine consultations and fifty lay lectures.

PENNSYLVANIA

Society News.—The Delaware County Medical Society meeting in Chester, February 12, was addressed by Dr. William Harvey Perkins, Philadelphia, on "Community Participation in Prevention."—At a meeting of the Centre County Medical Society in Bellefonte, February 12, Nollie B. Guerrant, Ph.D., State College, spoke on "The B Vitamins."

Philadelphia

Annual Thomas Oration.—Dr. Cornelius P. Rhoads, director, Memorial Hospital for the Treatment of Cancer and Allied Diseases, New York, gave the annual B. A. Thomas Oration before the Philadelphia Urological Society, January 26. His subject was "Genesis of Tumors."

First Aid Courses for Physicians.—The committee on national defense of the Philadelphia County Medical Society is sponsoring two courses in practical first aid. The first was given January 31, February 4 and February 7. Intended for physicians only, the courses consist of a demonstration of various first aid technics under the direction of Dr. Richard P. Shapiro.

Medical Genetics.—A series of lectures entitled "Our Ancestors, Ourselves, Our Descendants" opened at the College of Physicians under the auspices of the Woman's Medical College of Pennsylvania, January 23. Reginald Ruggles Gates, Ph.D., of the Marine Biological Laboratory, Woods Hole, Mass., gave the first talk. Laurence H. Snyder, Sc.D., professor of medical genetics, Ohio State University, Columbus, will speak, March 27, and Ernest A. Hooton, Ph.D., department of anthropology, Harvard University, April 24.

Memorial to Dr. Deaver.—The Lankenau Hospital is collecting material concerning the late Dr. John B. Deaver, emeritus professor of surgery at the University of Pennsylvania School of Medicine and professor of surgery at the graduate school, and for many years chief surgeon at the hospital, for a memorial collection in its library. Photographs, letters, memorabilia, reviews, press comments and articles by or about Dr. Deaver will be appreciated. Photostatic copies can be made of material available for loan only. Communications should be addressed to the Library Committee, the Lankenau Hospital.

WISCONSIN

Changes in Health Officers.—Dr. Kenneth F. PreFontaine, Slinger, has been appointed health officer for the village of Slinger; he occupies the same position for the village of Polk.—Dr. William H. Drissen, Port Washington, has been reappointed health officer of Ozaukee County.—Dr. George M. Shinnners, has been appointed health commissioner of Green Bay.

First Hobby Show.—The first statewide physicians' hobby show will be presented in connection with the one hundred and first anniversary meeting of the State Medical Society of Wisconsin in Milwaukee, September 16-18. The subjects represented in the exhibit will be bells, books, clay modeling, coins, dishes, documents, etchings, firearms, floriculture, glassware and glass blowing, jewelry, manuscripts, match covers, metal spinning, metal working, model railroads, motion pictures, musical instruments, paintings, prescriptions, sculpture, sketches, soap carving, stamps, photographs, surgical instruments, swords and knives, taxidermy, weaving, wood carving and wood working.

Society News.—Dr. Samuel F. Haines, Rochester, Minn., addressed the La Crosse County Medical Society in La Crosse, January 15, on "Management of Thyroid Disease and Exophthalmia."—The Milwaukee County Medical Society meeting in Milwaukee, January 9, was addressed by Drs. Maurice A. H. and W. H. Stovall, Madison, "Laboratory Medi-

cine in War."—Dr. Saul K. Pollack, Milwaukee, discussed "War Neuroses," January 22, at a meeting of the Outagamie County Medical Society in Appleton.—A meeting of the Walworth County Medical Society, at which members of the Woman's Auxiliary were guests, was held at Darien, January 8, as a farewell party for Dr. and Mrs. Lawrence H. Donath, Lake Geneva, who were leaving to make their home in Milwaukee.—Dr. Walter M. Kearns, clinical instructor in urology at Marquette University School of Medicine, Milwaukee, spoke on "Urinary Stone Formation in Recumbent Patients" before the Winnebago County Medical Society meeting, January 8, at Neenah.—The Milwaukee Neuro-Psychiatric Society was addressed, January 22, by Dr. John D. Camp, associate professor of radiology, University of Minnesota Graduate School, Rochester, Minn., on "Radiologic Diagnoses of Neuropsychiatric Disorders."

Trudeau Society Meeting.—The Wisconsin Trudeau Society met at Muidale Sanatorium, Wauwatosa, January 17, for the following program:

Dr. James J. King, Milwaukee, Tuberculosis of the Genitourinary Tract in Its Relation to Collapse Therapy.

Dr. Ralph E. Campbell, Madison, Pelvic Tuberculosis (Experimental and Clinical).

Dr. William L. Coffey, Wauwatosa, Bronchspirometry.

Dr. David D. Feld, Wauwatosa, Presentation of Cases of Blastomycosis.

A symposium on a comparison of three methods of miniature x-ray films was presented by Drs. Llewellyn R. Cole and Harold M. Coon, Madison, and Einar R. Daniels, Milwaukee. In the evening, William H. Feldman, M.S., Rochester, Minn., discussed "Results of Certain Chemotherapeutic Agents in Experimental Tuberculosis," and Dr. Loren L. Collins, Ottawa, Ill., "The Advantage of Tuberculin Testing Surveys Over the X-Raying of Entire Groups Without First Tuberculin Testing."

GENERAL

Red Cross Appoints Assistant Director of Health Service.—Dr. Amos Christie, associate professor of pediatrics, University of California Medical School, San Francisco, has been appointed assistant director of medical and health service of the American Red Cross, with headquarters in Washington. Dr. Christie graduated at California in 1929. For a time he served as specialist in pediatrics with the U. S. Children's Bureau.

Campaign Opens for Immunization of Children.—President Roosevelt's proclamation designating May 1 as Child Health Day marked the start of a campaign to have all children in the United States immunized against smallpox and diphtheria before May 1. The campaign will be sponsored by the Conference of State and Provincial Health Authorities of North America and the Children's Bureau of the U. S. Department of Labor, with the cooperation of the U. S. Office of Education, U. S. Public Health Service, state and local health departments and the public schools throughout the country. The state and local health departments will be the agencies for arranging for the immunization of children.

Insulin Regulations Promulgated.—Watson B. Miller, Acting Federal Security Administrator, promulgated regulations on February 4 providing for the certification of drugs containing insulin. They became effective immediately, except for two provisions under the section on labeling. Control over insulin was given to the Food and Drug Administration by the amendment to the Federal Food, Drug and Cosmetic Act approved on Dec. 22, 1941. An informal hearing was held on December 30 to consider proposed regulations providing for the certification of drugs containing insulin, in accordance with the amendment. The final regulations are published in the *Federal Register* of February 6. Copies may be obtained from the Superintendent of Documents, Government Printing Office, Washington, D. C., at 10 cents each.

Winthrop Chemical Company Fined.—According to the New York Times, a fine of \$15,800 was imposed, January 28, on the Winthrop Chemical Company by Federal Judge Simon H. Rifkind on the company's admission that it had shipped in interstate commerce an adulterated product improperly labeled as sulfathiazole tablets. The tablets were the subject of intensive police hunts here and in Chicago last spring, after it had been discovered that they contained a possibly harmful drug. The Winthrop company pleaded guilty to the charge of violating the Federal Food, Drug and Cosmetic Act, on which the fine was based. The tablets in question had been contaminated by phenobarbital, a sleep inducing drug which should be used on the advice of a physician, and then only in very small quantities. The government's allegations included charges that the drugs might have been harmful if used in accordance with instructions on the labels of their containers.

Annual Prize for Essay.—The Mississippi Valley Medical Society offers annually a cash prize of \$100, a gold medal and a certificate of award for the best unpublished essay on any subject of general medical interest, including medical economics, and practical value to the general practitioner of medicine. Certificates of merit may also be granted to the physicians whose essays are rated second and third best. Contestants must be members of the American Medical Association who are residents of the United States. The winner will be invited to present his contribution before the next annual meeting of the Mississippi Valley Medical Society at Quincy, Ill., September 30-October 2. The paper shall not exceed five thousand words, must be typewritten in English in manuscript form, must be submitted in five copies and must be received not later than May 1. Dr. Harold Swanberg, 209-224 W. C. U. Building, Quincy, Ill., is secretary of the society.

Central Surgical Association.—The second annual assembly of the Central Surgical Association will be held in Chicago, February 27-28, with headquarters at the Drake Hotel. Sessions will be held at the Presbyterian Hospital and the Illinois Research and Educational Hospital. Among the speakers will be:

- Drs. Brock E. Brush and Conrad R. Lam, Detroit, Effect of Topical Application of Several Substances on the Healing of Cutaneous Wounds: Experimental Study.
Dr. George Gavin Miller, Montreal, Two Hundred and Thirty Cases of Gastric Resection for Peptic Ulcer.
Dr. George E. Wilson, Toronto, Management of the Duodenum in Gastric Resection.
Dr. August F. Jonas Jr., Omaha, Post-Traumatic Strictures of the Intestine.
Dr. Bernard B. Larsen, Cleveland, A Method for the Insertion of the Smith-Petersen Nail Without an Initial Skin Incision.
Dr. Vinton E. Siler, Cincinnati, Acute Costal Chondritis Associated with Sternal Osteomyelitis.
Dr. Alfred W. Farmer, Toronto, Hypospadias.
Dr. John Harold Couch, Toronto, Bilateral, Preganglionic Sympathectomy for Raynaud's Disease with Gangrene of the Fingers.
Dr. William S. Keith, Toronto, Empyema of the Spinal Epidural Space.

Report of National Paralysis Foundation.—According to the third annual report of the National Foundation for Infantile Paralysis, more than \$805,000 was expended in seventy-two grants and appropriations during the year ended Sept. 30, 1941 to carry on research activities. Of this sum more than \$194,000 went to virus research in different medical schools, state health departments and institutions throughout the United States and Canada. Almost \$70,000 was used for nutritional research and \$84,000 for research for the prevention and treatment of after-effects of poliomyelitis. A large sum was expended in educational grants and in expenses covering epidemics and public health. Since 1934, when the celebrations for President Roosevelt's birthdays were inaugurated, more than \$9,000,000 has been collected in the various affairs held throughout the country to observe the occasion. Of this total more than \$4,000,000 has been left in communities, \$1,467,392.21 has been given to Georgia Warm Springs Foundation, \$241,000 has been given to the President's Research Commission, and more than \$3,000,000 has been given to the National Foundation since its organization in 1938. The work in the local field is conducted through more than two thousand chapters covering more than two thousand five hundred counties in the United States. The educational program of the foundation has been conducted on two fronts: first, grants have been made to agencies providing continued education to certain professional workers and, second, the foundation itself has engaged in direct education of professional groups and the lay public. In its consideration of the after-effects of infantile paralysis the foundation endorsed the treatment used by Miss Elizabeth Kenny, an Australian nurse, which, in the acute stage, includes the abandonment of splints and immobilization.

LATIN AMERICA

Pediatric Prize Awarded.—Dr. Juan P. Garrahan, a pediatrician of Buenos Aires, was awarded the 1941 prize of the Academia Nacional de Medicina of Buenos Aires for his article on "Prothrombin, Vitamin K and Hemorrhages in New-born Infants." The prize was established by the Academia in memory of the Argentine pediatrician Dr. Juan Carlos Navarro, who died in 1936. It was awarded every three years to the author of the best article on pediatrics submitted in competition to the Academia. Drs. G. F. Thomas and Alfredo Largaña, also of Buenos Aires and collaborators of Dr. Garrahan, won honorable mention.

Meetings on Ophthalmology.—The fifth Brazilian Congress of Ophthalmology will be held in Bahia, under the auspices of the Society of Ophthalmology of Brazil, in order that

members may attend the Pan American Congress of Ophthalmology to be held in Montevideo in November 1943. Dr. Harry S. Gradle, president of the Pan American Congress, met with officials of the Brazilian congress at the session in June 1941 to appoint the following committees to carry on the work of the Pan American Congress: international committee for the prevention of blindness, an international committee for trachoma and a committee for the interchange of ophthalmologic literature and one for cultural relations.—The Mexican Society of Ophthalmology, founded in 1893, will hold its next meeting Dec. 2, 1943. According to the *American Journal of Ophthalmology* the following program will be presented: Drs. Ernesto Olmos S., Mexico, D. F., will speak on "Evolution of the Sclerocorneal Suture and Intracapsular Extraction in Cataract Operation," and Manuel de Rivas Cherif, Mexico, D. F., "Insomnia of Ocular Origin."

FOREIGN

Polish Graduates at Edinburgh.—The first exercises in which students of the Polish School of Medicine received their degrees at Edinburgh University were held on Dec. 12, 1941, according to the *Lancet*. Sir Thomas Holland, vice chancellor, presided, and the degrees were conferred with the authority of the Polish government by Prof. A. T. Jurasz, dean of the Polish faculty of medicine. Four students received their degrees, one student from Warsaw, and three from Cracow.

Awards in Science.—The Royal Society of London has awarded the Copley Medal to Sir Thomas Lewis for experimental researches in clinic and laboratory on the heart and circulation and their disorders. The Davy Medal has been given to Henry D. Dakin, Ph.D., for pioneer work in biochemical research and his contribution to the study of intermediate metabolism. A medal has been awarded to Dr. Ernest Laurence Kennaway for his investigations on the production of cancer by synthetic substances. Dr. Kennaway is professor of experimental pathology at the University of London and director of the Chester Beatty Research Institute of the Royal Cancer Hospital, London.

Government Services

Federal Security Administrator Designates Habit Forming Drugs

Federal Security Administrator Paul V. McNutt has announced that he has issued an order promulgating a regulation under section 502(d) of the Federal Food, Drug and Cosmetic Act to become effective April 23. This regulation designates the chemical derivatives of the substances named in section 502(d) which are habit forming. It is based on the evidence presented to the public hearing held for that purpose in March 1941. The regulation is published in the *Federal Register* of January 23. Copies may be obtained from the Superintendent of Documents, Government Printing Office, Washington, D. C., at 10 cents each.

Hospitals Urged to Make Own Building Plans

Hospitals should go just as far as they can in arranging their own financing programs without waiting for hoped for aid from Defense Public Works grants or loans, according to a release from the Federal Works Agency. The statement was made by way of warning to a large number of hospitals which are said to be delaying fund raising or other financial programs for expansion of facilities while they await decisions on applications to the Federal Works Agency. In addition to the hospital projects which have already been approved, applications have been filed for additional hospital projects, the total estimated cost of which is more than \$155,000,000. Under the new Lanham Act appropriation only \$150,000,000 was made available for Defense Public Works of all types. The release pointed out that a number of these hospitals are not eligible under the act by reason of the fact that their need for expansion is not based on the defense program. It is obvious that the government will not be able to meet the entire need, and hospitals are urged to arrange in advance of their applications their own share of the financing that will be necessary. Where the beds are needed in the defense program, they must be provided as quickly as possible. Delay on the part of the hospitals in raising their part of the necessary funds will make it difficult for the government to assist them.

Foreign Letters

LONDON

(From Our Regular Correspondent)

Jan. 3, 1942.

The Medical Supervision of Industrial Workers

A special committee was appointed by the council of the British Medical Association to make recommendations for the better coordination of industrial medical practice with the existing medical system, particularly with general practice and the public health and hospital services. It has presented by deputation an important report to the minister of labor and national service. The starting point of the committee is the view, taken by the council of the British Medical Association, that the time is ripe for an extension of industrial medical service, that more emphasis should be laid on the preventive aspects of industrial medicine, that there should be a closer association between the medical profession and industry, and that the part played by industrial factors in the causation of disease should be more fully appreciated by physicians and employers.

Industry loses through the ill health of workers thirty-one million five hundred thousand weeks' work yearly. The environmental conditions during the working day must account for a large share of this. The loss from accidents in terms of money is estimated at over \$150,000,000 yearly. Accidents of course occur to the healthiest, but much time might be saved through adequate arrangements for medical supervision. One firm reports disappearance of its special hazard—lead poisoning—as a result of medical care. Firms with an average yearly loss through illness of ten days for men and twelve and one-half days for women found that rendering medical service available reduced the loss by from three and seventy-five one hundredths to five and twenty-five one hundredths days for men and four and five-tenths to seven and nine-tenths days for women. Medical supervision means not merely nursing, welfare, first aid and accident prevention or even the retention of a local physician on call for emergency. It means continuous supervision of the health of the individual worker in his industrial environment, the prevention as far as possible of physical and mental illness, a service for the initial treatment of injury, and efficient liaison between the factory and the external medical services.

A physician accepting a post in industry, whether part or whole time, should have some knowledge of industrial organization and factory methods. His duties should include (1) medical inspection of employees during working hours, (2) supervision of general working conditions, (3) organization and supervision of accident service, including rehabilitation and (4) study of specific occupational hazards and their prevention.

Only such treatment as is necessary during working hours should be undertaken in the factory, excepting industrial diseases which the medical officer is specially qualified to treat. Any further treatment should be undertaken by the patient's own physician or by the hospital to which he is referred. The need for good working relations between the general practitioner and the industrial medical officer is repeatedly stressed. Such contact as at present exists is far too limited.

Extension of the Age for Military Service and Conscription of Women

The age of compulsory military service for men has been raised from 41 to 51 years. But men called up over 41 will not be posted for the more active military duties. No one will be asked to do tasks for which he is physically unfitted. The age for military service is also to be lowered to 18½ years, and boys and girls between the ages of 16 and 18 are to be registered.

Women are now conscripted for services auxiliary to the fighting forces, but no woman is required to use a lethal weapon. The government already has power to direct married women

into industry. The new power of conscription will be applied in the first instance to unmarried women between the ages of 20 and 30. In the great field of married women doing necessary household work, comprising about eleven million, the government see the largest reserves for industry and home defense in the future. The part time employment of women in industry has already been developed, but on nothing like the possible scale. A great variety of arrangements are possible to enable women to divide up domestic tasks and be free to work close at hand in the factory or field. Thus five or more might arrange for each to cook a day in turn, or the development of crèches and public nurseries might free or partially free mothers from domestic duties. Women physicians will serve on medical boards to take care of the women called up.

Foreign Physicians in Britain

The large number of refugee foreign physicians in this country presents the medical authorities with a problem. Many are engaged in the service of their national armies training on British soil. Others engage in practice among the British. At the opening session of the General Medical Council (the disciplinary body for the medical profession) the president, Mr. H. L. Eason, said that the council admitted foreign physicians temporarily to the Medical Register but had been put to some difficulty by the wording of the defense regulation which allowed them to do this. A physician was barred from making an effective application unless he could show that he was by law entitled to practice in some country to which the regulation had been applied. But the right to practice had been withheld as part of the persecution on the continent. A new regulation now relieved an applicant of the obligation to show a title to practice if, alternatively, he held a medical diploma or had passed examinations qualifying for such diploma. The new regulation also allows temporarily registered foreign physicians to serve as assistants to British physicians.

Czech Examinations in London

The historic role of Britain as a refuge from persecution, political or religious, on the European continent is once more in evidence in the worst persecution that Europe has known. Not only have the refugees been welcomed but everything possible has been done for them. The hospitality of the University of Edinburgh for the Polish Medical School established within its portals has been previously described in *THE JOURNAL*. Some Czechs attend this school; they have none of their own in this country. However, at the request of the Czech minister of the interior and education in London, the examining board of the Royal College of Surgeons, England, has undertaken to conduct a special final examination (second and third *rigorosa*) for the Czechoslovak M.U.Dr. degrees. Part 1 (pathology and bacteriology) has been held in London, at which twelve candidates were examined, of whom eight passed.

Milk Rationing

Though the demand for liquid milk is higher than before the war, the supply in spite of every effort is lower. The Ministry of Food is using its war power of control to direct supplies to those who most need them. The ration of the ordinary citizen has been reduced to 2 pints weekly, while the first claim is given to mothers, children and adolescents. On the advice of the Special Diets Advisory Committee, the Medical Research Council and the British Medical Association arrangements have been made whereby physicians may prescribe quantities up to 2 pints daily, but they are asked not to prescribe the maximum in every case, because of the shortage. A priority claim up to a maximum of 2 pints daily is allowed in active tuberculosis, silicosis, diseases of the mouth, throat or gullet which interfere with swallowing, gastric and duodenal ulcer, prolonged fever and postoperative conditions after major operations. A priority claim up to 1 pint daily is allowed for active workers during an

incapacitating illness, sick children not attending school, dyspepsia due to conditions other than ulcer, colitis, diabetes, thyrotoxicosis and nephritis.

How the London Hospital Carries On

The extensive damage to the largest hospital in the metropolis, the London Hospital, by German bombs has been described in previous letters. The number of beds in use has been reduced to three hundred and fifty, less than half of the normal, but by means of branches opened in safer districts just outside London the hospital is doing more work than ever. The annex at Brentwood has three hundred and sixty beds and there have also been opened in the country two maternity homes and a hostel for expectant mothers. The hospital also maintains in London a first aid post and a mobile unit.

SWITZERLAND

(From Our Regular Correspondent)

Nov. 25, 1941.

Tuberculosis Mortality in Switzerland

The official figures on tuberculosis mortality in Switzerland give the picture portrayed in the accompanying table. In spite of the unfavorable general conditions that prevailed in Switzerland during 1940 there was a decrease in the mortality from pulmonary tuberculosis, but in the other forms of tuberculosis a slight increase was evident. However, on account of the summary statistical evaluation, the latter is of no particular significance. It has been determined by the president of the

Tuberculosis Mortality in Switzerland

Year	Pulmonary Tuberculosis		Other Forms of Tuberculosis		All Forms of Tuberculosis	
	Absolute	For 10,000 Inhabitants	Absolute	For 10,000 Inhabitants	Absolute	For 10,000 Inhabitants
1940	2,445	5.8	848	2.0	3,303	7.8
1939	2,569	6.1	802	1.9	3,371	8.0
1938	2,616	6.2	834	2.0	3,450	8.2
1937	2,770	6.6	857	2.1	3,627	8.7
1936	3,052	7.3	889	2.2	3,941	9.5

Swiss organization against tuberculosis, Dr. E. Bachmann, that the tuberculosis mortality of Switzerland is extraordinarily low. He proves that the numerous theories about connections between tuberculosis mortality and social milieu do not have the significance that was formerly ascribed to them. Furthermore, Dr. Bachmann emphasizes that the better therapeutic possibilities and the efforts of the antituberculosis organizations for the early diagnosis is to a high degree responsible for this decrease. These determinations are the more important since recent investigations in the pathologic anatomic institute of the university of Zurich have demonstrated that the permeation of the population with tuberculosis is about the same as forty years ago, although it has shifted into higher age groups.

Swiss Society for Psychiatry

At the 1941 meeting of the Schweizerische Gesellschaft für Psychiatrie, various reports of general interest were made. A. Repond of Lausanne directed attention to the scientific and practical problems presented by abnormal persons, which, thanks to the good organization in Switzerland, have found a better solution here than in many other countries. At any rate the training of special personnel in psychotherapy and psychoanalysis must be extended in order to relieve the psychiatrists.

Dr. H. Hanselmann of Zürich pointed out that psychiatric policlinics for children must be increased in number, that school physicians must have a better psychiatric training and that the fight against charlatanism in this sphere must be carried out

with greater energy than heretofore in order to exclude those who claim to be qualified but are not. Finally he emphasized the increasing need of the collaboration of psychiatrists in the estimation of psychopaths in prisons, in the care for difficult children in institutions and for the inmates of the houses of correction.

Dr. Bersot read a paper on the development of the care of abnormal persons in Switzerland. In 1880 there were sixty-seven institutions with 2,050 inmates, whereas today there are two hundred and forty-four with 12,541 inmates. Whereas in 1888 there were only two school classes for the abnormal, there are now two hundred and sixty with 4,761 pupils. The total number of abnormal persons in all of Switzerland is about 200,000. Dr. Repond established that of 69 children of the canton of Waadt who had committed minor thefts, only 12 were psychically normal. In numerous asocial children, Repond has been able to cure by psychologic treatment not only the defects due to wrong training or to the influences of bad environment but also the underlying disorder. However, this treatment is not given in institutions but through an organization of medicopedagogic welfare work; the child remains in the family, and frequently not only the child but the entire family is influenced and treated.

Prof. Dr. W. Boven of Lausanne has made detailed investigations on suicide and its causes. In the last forty years suicide has increased but little in Switzerland, that is from 0.022 per cent to 0.024 per cent. He concludes that in the families of persons with mental disease suicide is ten times as frequent as in other families; 30 per cent of the male suicides and 50 per cent of the female suicides are mental defectives. Boven computes how many people of Switzerland are exposed to suicide on the basis of a psychosis or of a schizoid or cyclothymic disposition; on this basis there are about 86,000 persons among whom there are only seven hundred and fifty suicides (0.73 per cent). This small proportion he ascribes to educational and protective measures and to mental hygiene measures. Prof. H. W. Maier, head of the department of psychiatry in Zürich, calls attention to the difficulties encountered in this respect in statistics on suicides, the more so since the true cause is often kept secret.

At the suggestion of the president of the Swiss department of health, Prof. H. Steck of Lausanne, an inquiry has been made among Swiss psychiatrists about the dangers of public demonstrations of hypnotism and suggestion. Some of the answers indicate that harmful effects have been produced by these demonstrations.

Psychology of the Aged

The psychology of the aged was discussed in the Medizinische Gesellschaft of Basel by Dr. A. L. Vischer of the university clinic for internal medicine, who directs attention to the difficulties encountered in research on the process of aging. One of the difficulties is that involution does not follow such clear and uniform laws as does growth; another one is that aging is often accompanied by pathologic processes. Experimental psychology has furnished few new contributions in explanation of the process of aging. Vischer thinks that this is due to the fact that insufficient attention was given to the course of earlier life. It has been justly pointed out that in the further explanation of these problems intellectual analyses are fertile in the explanation of mental conditions. A first attempt in this direction is Brinkmann's analysis of the late works of art of the great masters. An important phenomenon of the aging process to which little attention has been given heretofore is the changed evaluation of time. The consciousness of the future plays an important part in all these problems. When this consciousness of the future disappears and compensation is lacking, the formative power of time, which may be called the frame of life, breaks down. In the ruins of

this breakdown of the formative power of time there remain as only remnants of the framework of time the banal division into the parts of the day and the animal functions. Such decay in the formative power of time can appear also in young persons under artificially produced external conditions. Vischer observed such phenomena on war prisoners, whose mental observations he described previously under the term "barbed wire disease."

Infectious Diseases in Switzerland

According to reports received by the Swiss Bureau of Health, scarlet fever has increased since 1937. It occurred chiefly in endemic form but was of benign character. Diphtheria has decreased since 1937. There were 772 cases in 1937, 716 in 1938, 751 in 1939 and 663 in 1940; the fatalities for the years 1937 to 1939 inclusive were 37, 50 and 33, respectively.

The incidence of abdominal typhoid is low in Switzerland. This indicates favorable hygienic conditions, of importance on account of the military service.

Infantile paralysis decreased from 521 cases in 1939 to 237 in 1940. This disease was chiefly of sporadic character; it appeared mostly in those rural regions which had escaped during the epidemics of 1936 and 1937. It was in Switzerland that the potassium chlorate treatment of poliomyelitis was suggested several years ago. At first the treatment seemed to produce good results, but subsequent investigations did not corroborate the initial successes.

The number of cases of cerebrospinal meningitis continued to rise during 1940. In all, 710 cases were reported. This high number, which applies only to the civil population, had never before been reached in Switzerland. The highest numbers so far had been 102 in 1915 and 109 in 1916. Yet the disease did not have a truly epidemic character but seemed to manifest itself mostly in local accumulations of sporadic cases, which were distributed over nearly the entire country. However, the high mortality which prevailed formerly has decreased greatly since serotherapy has been supplemented, if not replaced, by the sulfonamides.

Bang's disease (*Brucella abortus* infection) has decreased from 157 cases in 1937 to 120 cases in 1940.

BUENOS AIRES

(From Our Regular Correspondent)

Jan. 11, 1942.

Bronchocinematography

Drs. Mariano R. Castex, Egidio S. Mazzei and Manuel Malenchini succeeded in carrying on cinematography of the bronchial tree in normal and pathologic conditions. The work was done in the Instituto de Investigaciones aplicadas a la Patologia Humana, which is a department of the National School of Medicine of Buenos Aires, under the direction of Prof. Mariano R. Castex. The technic used was that which has been previously reported by Manoel de Abreu of Brazil in which the films are obtained after injecting iodized oil in the bronchial tree. This is the first time that bronchocinematography has been attempted in Buenos Aires. The accurate and detailed dynamics of the bronchial tree during the different phases of respiration can be interpreted by the films, which are obtainable at a rate, per second, of from 8 to 16 for each respiratory cycle. The bronchocinematographic results confirm observations previously reported by Castex, who found that there are two different types of bronchial movements, passive and active. The former are movements of pulsation, which is transmitted to the bronchi from the heart, aorta and pulmonary artery and also from the esophagus during deglutition. The latter are movements which occur when the bronchi change in size and caliber and during peristalsis and torsion. Films of normal bronchi exhibit bronchial movements (1) of elongation in a given direction, (2) of expansion from increase

of the bronchial caliber, (3) of dispersion or radial amplification of movements and (4) of internal inspiratory torsion at the lower lobules. Films of patients with bronchial diseases exhibit abnormal movements, especially those given by the changes of caliber of the bronchi during elongation of the structure. The caliber of the bronchi increases moderately (or does not increase at all) in patients with chronic bronchial diseases. It diminishes in bronchial asthma and in bronchiectasis. In bronchial asthma the cinematographic figure is of difficult interpretation. It exhibits changes from forced respiration and from hyper-tonicity of the system of elastic muscular fibers of the bronchopulmonary structures. In bronchial asthma and in some cases of bronchiectasia the bronchocinematographic figure is inverted during inspiration. It shows diminution of the bronchial caliber during elongation of the bronchi from inspiration.

Congress on Population Problems

The first congress of problems of population was held in Buenos Aires some time ago. The members of the Museo Social Argentino, who were also members of the organizing committee of the congress, made a compilation of the articles presented and they prepared a book with four hundred and seventy pages which was recently published. The government is taking note of the concentration in the large cities of the country. Some years ago the urban population was 35 per cent and the rural population 65 per cent. In 1938 the urban population was 74 per cent and the rural population 26 per cent. The congress recommended (1) official loans to couples (especially rural couples) who want to get married, (2) help to parents of large families as well as to couples with young children and (3) education of the public in problems of sex and hygiene in order to increase the birth rate. Dispensaries for pregnant women and health centers for mothers and their children should be established all through the country. Obstetricians should give obstetric and medical care gratis to delicate mothers during labor as well as to women in premature or abnormal labor. Children should be protected against food insufficiency. Pregnant working women and working mothers of young infants should be helped to protect them against occupational diseases and their complications. A department of social workers should be organized to work in remote regions of the country. A special branch of the national department for recording births should be established, in which only cases of mortality should be recorded. This special record aims to diminish abortion and feticide, which are the most frequent factors in lowering the coefficient of natality. Teaching of preventive medicine should be regarded as of special importance in the universities with the aim of preventing disease, invalidism and premature death of students. It is advisable to construct hospitals for patients with chronic diseases in the open country or in the mountains and to establish agricultural and other types of work in rural zones around the hospitals for increasing the population in those regions.

Marriages

AUGUSTUS McCRAVEY, Chattanooga, Tenn., to Miss Helen M. Welles of Cummington, Mass., at Fort Bragg, N. C., Nov. 15, 1941.

GEORGE FRANCIS BUSBY, Salisbury, N. C., to Miss Dorothy Rudy at St. Petersburg, Fla., in December 1941.

SAMUEL ETINGE ELMORE JR., Spindale, N. C., to Miss May Carroll Miles in New Orleans in December 1941.

HAROLD BARKER KERNOULE, Elon College, N. C., to Miss Ernestine Robertson at Durham, Dec. 19, 1941.

WILLIAM RULE III to Miss Effie Hampton Crane, both of Lubondai, Belgian Congo, Africa, recently.

BENJAMIN F. STREETS, Sutersville, Pa., to Miss Louise Rowe at Pittsburgh, Dec. 14, 1941.

Deaths

Samuel Waldron Lambert, New York, dean emeritus at Columbia University College of Physicians and Surgeons, died, February 9, at his home of heart disease, aged 82. Dr. Lambert was born in New York, June 18, 1859. He graduated at Yale University, New Haven, Conn., and in 1885 at the College of Physicians and Surgeons, then the medical department of Columbia University. He was attending physician on the staffs of the Nursery and Child's Hospital, 1890-1896, New York Lying-In Hospital, 1890-1905, New York Hospital, 1896-1909, St. Luke's Hospital, 1906-1929, a trustee of the Roosevelt Hospital from 1904 to 1919 and a consultant to many hospitals in the metropolitan area. He was professor of clinical medicine at Columbia from 1903 until 1919 and dean from 1904 to 1919 and was president of the New York Academy of Medicine from 1926 through 1928. Dr. Lambert was a member of the Medical Society of the State of New York, the Association of American Physicians and the American Gastro-Enterological Association. He was the author of "Medical Leaders: From Hippocrates to Osler," with G. M. Goodwin as co-author, of "When Mr. Pickwick Went Fishing" and of numerous papers in the periodical literature. The growth and development of the present Medical Center at Columbia University is attributed largely to Dr. Lambert.

John Joseph McLoone, Santa Monica, Calif.; George Washington University School of Medicine, Washington, D. C., 1910; member of the House of Delegates of the American Medical Association in 1916; member of the Pacific Coast Oto-Ophthalmological Society; fellow of the American College of Surgeons; formerly attending ophthalmologist and otologist, St. Joseph's Hospital, Phoenix, Ariz.; aged 61; died, Dec. 26, 1941.

Oscar P. Honegger, Lake Mahopac, N. Y.; Universität Heidelberg Medizinische Fakultät, Baden, Germany, 1879; member of the Medical Society of the State of New York; aged 86; died, Dec. 25, 1941, in East Portchester, Conn., of fracture of the left hip and bronchopneumonia.

Charles David Ripley, Point Pleasant, N. J.; College of Physicians and Surgeons, medical department of Columbia College, New York, 1889; member of the Medical Society of New Jersey; aged 77; died, Dec. 25, 1941, in East Orange of coronary thrombosis.

Herman S. Pepoon, Chicago; Hahnemann Medical College and Hospital, Chicago, 1883; for many years a teacher of botany at the Lake View High School; aged 81; died, Dec. 26, 1941, in the Augustana Hospital of carcinoma of the prostate.

Samuel William Green ☉ Brooklyn; Albany (N. Y.) Medical College, 1917; served during the World War; on the staff of the Jewish Hospital from 1922 to 1941; aged 47; died, Dec. 26, 1941, of chronic nephritis and hypertension.

Carroll C. Strickland, Detroit; Meharry Medical College, Nashville, Tenn., 1908; member of the Michigan State Medical Society; on the staff of the Parkside Hospital; aged 59; died, Dec. 26, 1941, of malignant hypertension.

John P. Brown, Fairmont, N. C.; University of Maryland School of Medicine, Baltimore, 1883; member of the Medical Society of the State of North Carolina; for many years mayor; aged 77; died, Dec. 7, 1941, of uremia.

William McMullen Garretson, East Petersburg, Pa.; Jefferson Medical College of Philadelphia, 1903; member of the Medical Society of the State of Pennsylvania; aged 61; died, Dec. 28, 1941, of cerebral hemorrhage.

William White ☉ El Paso, Texas; Kentucky School of Medicine, Louisville, 1891; University of Pennsylvania Medical Department, Philadelphia, 1892; aged 77; died, Dec. 13, 1941, of a skull fracture received in a fall.

William Earle Grady, Tryon, N. C.; University of Maryland School of Medicine, Baltimore, 1894; member of the Medical Society of the State of North Carolina; aged 70; died, Dec. 9, 1941, of coronary thrombosis.

James Michael Popp ☉ New Castle, Pa.; Western Pennsylvania Medical College, Pittsburgh, 1897; aged 78; on the staff of the New Castle Hospital, where he died, Nov. 28, 1941, of strangulated left inguinal hernia.

Eldridge H. Campbell, Alderson, W. Va.; College of Physicians and Surgeons, Baltimore, 1894; member of the West Virginia State Medical Association; aged 73; was found dead, Dec. 21, 1941, of coronary thrombosis.

Terence Bernard O'Neil, Ilion, N. Y.; Baltimore Medical College, 1901; member of the Medical Society of the State of New York; on the staff of the Ilion Hospital; aged 66; died, Dec. 7, 1941, of heart disease.

John Peter Byrnes, Springfield, Mass.; Albany (N. Y.) Medical College, 1914; fellow of the American College of Surgeons; served during the World War; aged 50; died, Dec. 30, 1941, of cerebral hemorrhage.

Frederick James Pate ☉ Greensboro, N. C., University of Maryland School of Medicine, Baltimore, 1908; served during the World War; aged 56; died, Dec. 14, 1941, in St. Leo's Hospital of carcinomatosis.

Benjamin Mikelsky Mikels ☉ Long Beach, Calif.; Medical School of Maine, Portland, 1914; aged 59; on the staff of the Seaside Memorial Hospital, where he died, Dec. 19, 1941, of hypertensive heart disease.

Herbert Lee Garland, Logansport, La.; Louisville (Ky.) Medical College, 1906; member of the Louisiana State Medical Society; aged 61; died, Dec. 20, 1941, in a hospital at Shreveport of heart disease.

George Washington McSweeney, New York; Fordham University School of Medicine, New York, 1911; served during the World War; aged 52; died, Dec. 25, 1941, in the Veterans Administration Facility.

Emrys Richards, Wilkes-Barre, Pa.; University of Pennsylvania Department of Medicine, Philadelphia, 1900; aged 67; died, Dec. 24, 1941, in the Mercy Hospital of carcinoma of the liver and stomach.

William Edward Wills, Corpus Christi, Texas; Memphis (Tenn.) Hospital Medical College, 1904; health officer from April 1919 to April 1925; aged 67; died, Dec. 16, 1941, of cerebral hemorrhage.

William Osenbach, Orlando, Fla.; Central College of Physicians and Surgeons, Indianapolis, 1896; aged 73; died, Dec. 11, 1941, of acute pyelonephritis, uremia and carcinoma of the penis.

Thomas Adolphus Michie, Steele, Mo.; Memphis (Tenn.) Hospital Medical College, 1895; aged 71; died, Dec. 16, 1941, in the Methodist Hospital, Memphis, Tenn., of coronary thrombosis.

George Ramson Wilkins, Cleveland; Cleveland Homeopathic Medical College, 1899; served during the World War; aged 71; died, Dec. 12, 1941, of coronary occlusion and arteriosclerosis.

Joseph Edwin Showalter, Waterloo, Ind.; University of Wooster Medical Department, Cleveland, 1893; formerly member of the local board of education; aged 78; died, Dec. 1, 1941.

Frank Hulburt Booth, Chicago; Rush Medical College, Chicago, 1885; aged 81; died, Dec. 6, 1941, in the Research and Educational Hospital of carcinoma of the bladder.

Clifford Kuykendall Logan ☉ Hominy, Okla.; University of Oklahoma School of Medicine, Oklahoma City, 1920; aged 46; died, Nov. 14, 1941, of carcinoma of the pharynx.

Edwin Percy Moore, South Bend, Ind.; University of Pennsylvania Department of Medicine, Philadelphia, 1893; aged 71; died, Dec. 22, 1941, in the Epworth Hospital.

John Herman Mills ☉ Tampa, Fla.; Jefferson Medical College of Philadelphia, 1895; owner of a hospital bearing his name; aged 70; died, Dec. 21, 1941, of pneumonia.

Myles William O'Reilly, Newark, N. J.; Queen's University Faculty of Medicine, Belfast, Ireland, 1880; died, Dec. 19, 1941, in Maplewood of arteriosclerosis.

Wilbur Henson Hale, Narrows, Va.; Medical College of Virginia, Richmond, 1928; aged 39; died, Dec. 25, 1941, in a hospital at Lexington, Ky., of pneumonia.

William Samuel Moore, Heath Springs, S. C.; University of the City of New York Medical Department, New York, 1890; aged 78; died, Dec. 2, 1941.

Hiram Otto Green, Spencer, Iowa; St. Louis College of Physicians and Surgeons, 1895; aged 71; died, Dec. 14, 1941, of coronary sclerosis.

Robert Augustus Holcomb, Hickory Flat, Miss. (licensed in Mississippi in 1900); aged 64; died, Dec. 4, 1941, of pulmonary tuberculosis.

Charles A. Teeters, Washington C. H., Ohio; College of Physicians and Surgeons, Baltimore, 1888; aged 83; died, Dec. 27, 1941, of senility.

Correspondence

PROTEUS VULGARIS AS GAS PRODUCER IN DIABETES

To the Editor:—In *THE JOURNAL*, Dec. 27, 1941 Carl L. Gillies reported 4 cases of interstitial emphysema in diabetes caused by the colon bacillus. It seems worth while at this time to call attention to the fact that *Proteus vulgaris* may also be a producer of gas in cases of diabetes.

In August 1939, in Joseph Tenopyr's service at Kings County Hospital, Brooklyn, I attended a young diabetic Negress who had a painful, large, hard, cracked callosity on the heel. While she was in the hospital an area of cellulitis adjacent to the callus appeared, associated with a decided elevation of the pulse rate and of the temperature. A dirty brownish serous discharge with a "musty" odor oozed from the crack, and a few days later an area of crepitation in the tissues surrounding the heel was noted, which soon spread to involve similarly the entire lower extremity. Roentgen studies confirmed the presence of interstitial emphysema. Repeated cultures of material taken from the wound were negative for anaerobic gas bacilli but all were positive for *P. vulgaris*, which was at first regarded as a contaminant. Despite therapy with large doses of sulfanilamide and anti-gas gangrene serum, blood transfusions, intravenous fluids and other supportive measures, the patient ran the course of a severe septicemia and died in a few days. Postmortem cultures taken from the affected limb and from the heart's blood were positive for *P. vulgaris*.

A perusal of the literature at that time showed that others had noted that *P. vulgaris* may be a producer of gas in cases of diabetes.

This organism should be considered also in the differential diagnosis of gas gangrene in cases of diabetes.

HAROLD L. LEDER, M.D.,
U. S. Veterans' Administration Facility,
Columbia, S. C.

METRAZOL SHOCK TREATMENT

To the Editor:—In the discussion of the paper by Dr. Erich Liebert entitled "Spontaneous Convulsions Following Metrazol Treatment" (*THE JOURNAL*, January 10, p. 119), Dr. Roy R. Grinker of Chicago makes the following statement:

At one time I indicated that, with metrazol, psychiatrists hardly waited for the patient to take his clothes off before he was shocked, and now we learn from Dr. Myerson that it is not necessary to hospitalize a patient, that one can shock him in one's office, keep him there for an hour or two and then return him home. This I consider extremely dangerous, since before long such easily applied therapy will be appropriated by the inexperienced and used promiscuously and indiscriminately.

Dr. Grinker is entirely mistaken when he states that I have advocated the use of shock treatment of any kind in an office, and I do not know what grounds he has for making any statement to the effect that I regard this treatment as casual or of the office type. While I have given considerable electric shock treatment, none of it has been done in my office, and all of it has been done in a hospital. I have stated that it is not necessary to hospitalize the patient; that after a wait of one to two hours the patient may return home, but this is by no means equivalent to casual or office treatment. I am strongly against the use of either metrazol or electric shock therapy in any office, and there is nothing in any of my writings which indicates that such treatment is regarded by me as something to be carried out in any hit or miss fashion.

ABRAHAM MYERSON, M.D., Boston.

TREATMENT OF PEPTIC ULCER

To the Editor:—The article by Drs. Dick and Eisele on peptic ulcer (*THE JOURNAL*, January 3, p. 38) was read by me with great interest, chiefly because the mode of treatment promulgated by the authors was at variance with the more generally accepted therapy for this condition. Without analyzing the contents of the article or entering into the controversy which it will no doubt provoke, locally or generally, I wonder why the authors with their emphasis on the use of cream in the treatment of peptic ulcer did not indicate in at least one sentence the physiologic rationale of the use of that substance, in that its ingestion leads to the liberation of enterogastrone, a chalone, which inhibits not only gastric motility but also the formation (secretion) of gastric juice with its hydrochloric acid content, as shown by Drs. Ivy and Lim several years ago.

ARNO B. LUCKHARDT, M.D., Chicago.

NOTE:—This letter was referred to the authors, who reply:

To the Editor:—The only reason the physiologic principles governing the treatment of gastric and duodenal ulcers were not discussed more extensively in our article in *THE JOURNAL* was that of brevity.

We thought that the important thing was to record the facts and results rather than to give theoretical explanations for them.

However, the remarks are both interesting and pertinent, and we would have no doubt of the importance of inhibition by enterogastrone of gastric mobility and acidity in the treatment of ulcer.

GEORGE F. DICK, M.D.
C. WESLEY EISELE, M.D.
Chicago.

PSEUDOEPITHELIOMATOUS HYPERPLASIA

To the Editor:—S. H. Mercer and M. E. Obermayer in *THE JOURNAL*, January 10, describe a case of "multiple pyoderma with pseudoepitheliomatous hyperplasia" which at biopsy showed features so suggestive of squamous cell carcinoma that a dermatologist and a pathologist independently made that diagnosis. The incorrectness of the histologic diagnosis was soon brought out by the clinical course of the disorder.

Of course it is often difficult to arrive at a histologic diagnosis without a thorough study of the clinical picture, yet this is sometimes done.

The sections presented in the article do not show high vascularization so essential for the diagnosis of granulomas. Atypical epithelial overgrowth with keratinization and mitosis without a tendency to cover the surface sufficiently is frequent in old ulcers.

The essential process in the sections is that of keratosis and parakeratosis pushing into the corium. In figure 2 a refractile "corps rond" can be seen which is characteristic for Darier's disease.

C. M. MEZEY, M.D., Forest Hills, N. Y.

POIKILODERMA-LIKE CHANGES ON THE SKIN FOLLOWING ARSPHENAMINE DERMATITIS

To the Editor:—I was interested to note in the article "Poikiloderma-like Changes in the Skin Following Arspenamine Dermatitis," by Dr. A. Benson Cannon and his associates, appearing in the January 10 issue of *THE JOURNAL*, that the possibility of Jacobi's original case of poikiloderma atrophicans vasculare having been due to previously administered arspenamine was mentioned. On page 128 in the middle of the first paragraph the authors state: "One wonders whether if Jacobi had examined his patient for arsenic or if he had followed him

over a long period he too might not have been able to classify the condition as being due to a postarsphenamine dermatitis.

This is a surprising statement in view of the fact that Jacobi's case was presented in 1906 and that arsphenamine (salvarsan) was not announced by Ehrlich until 1910. Of course the arsenic could have been introduced in some other form, but the possibility of arsphenamine having been the source is definitely out.

JOSEPH M. SHELTON, M.D., Washington, Pa.

Medical Examinations and Licensure

COMING EXAMINATIONS AND MEETINGS

BOARDS OF MEDICAL EXAMINERS

BOARDS OF EXAMINERS IN THE BASIC SCIENCES

Examinations of boards of medical examiners and boards of examiners in the basic sciences were published in THE JOURNAL, February 14, page 557.

NATIONAL BOARD OF MEDICAL EXAMINERS

NATIONAL BOARD OF MEDICAL EXAMINERS: Part III. Various centers, June. Exec. Sec., Mr. Everett S. Elwood, 225 S. 15th St., Philadelphia.

EXAMINING BOARDS IN SPECIALTIES

AMERICAN BOARD OF ANESTHESIOLOGY: *Oral*. Part II. Atlantic City, June 6-7. Final date for filing application is March 7. Sec., Dr. Paul M. Wood, 745 Fifth Ave., New York.

AMERICAN BOARD OF DERMATOLOGY AND SYPHILOLOGY: *Oral and Written*. Groups A and B. Cleveland, Jan. 14-15, 1943. Final date for filing application is Oct. 15. Sec., Dr. C. Guy Lane, 416 Marlboro St., Boston.

AMERICAN BOARD OF INTERNAL MEDICINE: *Oral*. St. Paul, April, in advance of the meeting of the American College of Physicians, and Philadelphia, June, in advance of the meeting of the American Medical Association. Applications should be on file 6 weeks in advance of the date of oral examination. *Written*. Oct. 19. Final date for filing application is Sept. 1. Sec., Dr. William S. Middleton, 1301 University Ave., Madison, Wis.

AMERICAN BOARD OF NEUROLOGICAL SURGERY: New York, May 12-13. Sec., Dr. R. Glen Spurling, 404 Brown Bldg., Louisville, Ky.

AMERICAN BOARD OF OBSTETRICS AND GYNECOLOGY: *Oral*. Part II. Groups A and B Atlantic City, May or June. Final date for filing application is March 1. Sec., Dr. Paul Titus, 1015 Highland Bldg., Pittsburgh.

AMERICAN BOARD OF OPHTHALMOLOGY: *Oral*. Baltimore, June 6 and Philadelphia, June 8. Sec., Dr. John Green, 6830 Waterman Ave., St. Louis.

AMERICAN BOARD OF OTOLARYNGOLOGY: *Oral and Written*. All Groups. Philadelphia, June, preceding the meeting of the American Medical Association. Final date for filing application is March 1. Sec., Dr. W. P. Wherry, 1500 Medical Arts Bldg., Omaha.

AMERICAN BOARD OF PSYCHIATRY AND NEUROLOGY: *Oral*. Boston, May 15-16. Final date for filing application is March 1. Sec., Dr. Walter Freeman, 1028 Connecticut Ave. N.W., Washington, D. C.

AMERICAN BOARD OF RADIOLOGY: *Oral*. All Groups. Atlantic City, June 4. Final date for filing application is April 1. Sec., Dr. Byrl R. Kirklind, 102-110 Second Ave., S. W., Rochester, Minn.

AMERICAN BOARD OF SURGERY: *Written*. Part I. Various centers, March 2. Sec., Dr. J. Stewart Rodman, 225 S. Fifteenth St., Philadelphia.

Georgia October Report

The Georgia State Board of Medical Examiners reports the written examination for medical licensure held at Atlanta, Oct. 14-15, 1941. The examination covered 10 subjects and included 100 questions. An average of 80 per cent was required to pass. Three candidates were examined, 2 of whom passed and 1 failed. Eleven physicians were licensed to practice medicine by reciprocity and 1 physician so licensed on endorsement of credentials of the National Board of Medical Examiners. The following schools were represented:

School	PASSED	Year Grad.	Number Passed
Emory University School of Medicine.....	(1941)		1
University of Illinois College of Medicine.....	(1938)		1
School	FAILED	Year Grad.	Number Failed
Boston University School of Medicine.....	(1923)		1
School	LICENSED BY RECIPROCITY	Year Grad.	Reciprocity with
University of Louisville Medical Department.....	(1907)		Kentucky
Tulane University of Louisiana School of Medicine...	(1936)		Louisiana
University of Minnesota Medical School.....	(1900)		Minnesota
University of Pittsburgh School of Medicine.....	(1900)		Penna.
Medical College of the State of So. Carolina.....	(1917)		S. Carolina
University of Tennessee College of Medicine.....	(1936)		Tennessee
Vanderbilt University School of Medicine.....	(1936)		Tennessee
University of North Carolina School of Medicine.....	(1936)		N. Carolina
University of Virginia School of Medicine.....	(1936)		Virginia
School	LICENSED BY ENDORSEMENT	Year Grad.	
Harvard Medical School.....	(1939)		

Kentucky December Report

The State Board of Health of Kentucky reports the written examination for medical licensure held at Louisville, Dec. 8-10, 1941. The examination covered 11 subjects and included 110 questions. An average of 70 per cent was required to pass. Four candidates were examined, all of whom passed. Seven physicians were licensed to practice medicine by reciprocity and 2 physicians so licensed by endorsement. The following schools were represented:

School	PASSED	Year Grad.	Number Passed
University of Chicago, The School of Medicine.....	(1940)		1
University of Louisville School of Medicine.....	(1941)		1
Tulane University of Louisiana School of Medicine..	(1941, 2)		2
School	LICENSED BY RECIPROCITY	Year Grad.	Reciprocity with
University of Alabama School of Medicine.....	(1909)		Alabama
University of Kansas School of Medicine.....	(1930)		Kansas
Harvard Medical School.....	(1935)		Florida
Medical College of Virginia.....	(1940)		Virginia
University of Tennessee College of Medicine.....	(1931), (1940, 2)		Tennessee
School	LICENSED BY ENDORSEMENT	Year Grad.	Endorsement of
Yale University School of Medicine.....	(1936)		N. B. M. Ex.
Indiana University School of Medicine.....	(1940)		U.S.P.H.S.

Bureau of Legal Medicine and Legislation

MEDICOLEGAL ABSTRACTS

Malpractice: Statute of Limitations Does Not Begin to Run Until Cessation of Treatment.—The plaintiff fell while lifting a heavy rock, April 4, 1938, his back striking against the sharp edges of a rock wall. He called in the physician defendant April 9, but as to just what symptoms, other than a pain in the back, the patient exhibited and what examination the physician made or what treatment he instituted, the reported decision does not make clear other than to state that the physician "continued to diagnose and to treat the plaintiff [patient] for lumbago," which the physician presumably continued to do until August 15, when his connection with the case ended. About June 10, the patient's condition had become no better and he, so he alleged, requested the physician to have roentgenograms made, but the physician refused to do so. Finally, on August 15, the physician sent the patient to a hospital in Omaha, where a complete examination, including roentgenograms, made by other physicians apparently revealed an injury to the left sacroiliac joint, a fracture of the laminae of the fifth lumbar vertebra on the lower left side and displaced, torn and strained muscles, cords and tendons surrounding and connected with the left sacroiliac joint of the fifth lumbar vertebra. The patient was then placed in a plaster cast to immobilize the fractures. Eventually, whether before the time of this examination or sometime later is not clear, the left sciatic nerve became impinged and the "spinal column and the sacroiliac joint became deformed."

The patient subsequently instituted an action for malpractice against the defendant, the original petition being filed April 20, 1940 and an amended petition July 19, 1940. The amended petition alleged, essentially, that the plaintiff employed the defendant as a physician to perform such services in the treatment of his injuries as were proper in such case; that it was the physician's duty to diagnose the cause, to find from an examination the injuries suffered by the plaintiff and to treat them in the manner usually done by physicians in his locality, and that the defendant failed and neglected to perform those duties. The defendant demurred to the amended petition on the ground that the suit was barred by the statute of limitations (Neb. Comp. St. Supp. 1939, Sec. 20-208) "which limits the bringing of malpractice actions to two years." The trial court sustained the demurrer, holding that the suit was barred by statute of limitations which had begun to run on April 9, 1938 when the physician failed properly to diagnose the patient's condition. The patient then appealed to the Supreme Court of Nebraska.

The only question for the determination of the Supreme Court was whether or not the patient's cause of action had been barred by the statute of limitations. This Court, said the Supreme Court, has never passed on the question as to when the statute of limitations begins to run in a malpractice action. The courts of California, Iowa, Maryland, Massachusetts, Montana and Vermont have adopted the rule that the statute begins to run from the time of the negligent act or the breach of duty rather than from the date of the damage caused. In applying that rule, said the Court, to the instant case, the malpractice charged is a breach of duty correctly to diagnose the nature and cause of the patient's disability. Therefore, treatment and prescription must necessarily be distinguished from diagnosis. The trial court reasoned:

The injury to the patient's legal rights which gives rise to his cause of action occurs at the time that it is charged the correct diagnosis should have been made (April 9, 1938), for that is when the physician breached his duty.

The reasoning is supported by this rule. But this rule has not been applied in some other states, notably in Michigan, Minnesota and Ohio, whose courts have held that the statute does not begin to run until treatment ends. In *Schmitt v. Esser*, 178 Minn. 82, 226 N. W. 196, for instance, the Supreme Court of Minnesota said:

The statute of limitations does not commence to run against a cause for malpractice of a surgeon employed to treat a fracture until his treatment ends. . . . In malpractice cases, there is, of course, difficulty in determining the precise moment when the act or omission which caused the damage took place. The neglectful or unskilful act may occur at some particular moment in months of attendance upon the patient, or it may persist and characterize the whole treatment. Therefore it would seem advisable not to apply the bar of the statute on demurrer, unless it clearly appears from the complaint that the unskilful or negligent act which caused the injury took place at a date more than two years before the action was brought.

In determining, said the Supreme Court, which of the foregoing rules we should adopt, it is necessary to review definitions applicable. It is noted that the defendant contends that faulty diagnosis, in and of itself, constituted the breach of duty owing by the physician to his patient, that the resulting damage to the patient by virtue of the treatment by the physician is separable from the diagnosis, and, apparently, that the statute should run from the time the faulty diagnosis was made. "Diagnosis" is defined by Webster's New International Dictionary, second edition, as follows: "The art or act of recognizing the presence of disease from its symptoms, and deciding as to its character; also, the decision reached." "Determination of a type or condition through case or specimen study." "Conclusion arrived at through critical perception or scrutiny." The foregoing definitions are practically the same as those contained in Dorland's American Illustrated Medical Dictionary, sixteenth edition, and in Stedman's Medical Dictionary, 1939, latest edition, with the exception that in the latter the diagnosis is divided into several parts: "clinical diagnosis," made from a study of the symptoms only (in the instant case the petition indicates that the diagnosis made by the physician was by the symptoms); "physical diagnosis," a diagnosis made by means of physical measure, such as . . . palpation and inspection." The latter is apparently the diagnosis which it is alleged in the amended petition should have been made. "Malpractice" is defined in Webster's New International Dictionary, second edition, as "the treatment of a case by a surgeon or physician in a manner contrary to accepted rules and with injurious results to the patient; hence, any professional misconduct or any unreasonable lack of skill or fidelity in the performance of professional or fiduciary duties." In Stedman's Medical Dictionary, "malpractice" is defined as "mistreatment of a disease or injury through ignorance, carelessness. . . ." In the very definition of malpractice, continued the Court, "treatment" is the predominating word and is not separated from "diagnosis." This would indicate that in the treatment of a patient the diagnosis must change from time to time, and it is commonly accepted in the medical profession that the diagnosis, in the first instance, is not binding on the physician. He should have the right, during the course of treatment, to change the diagnosis. With this in mind, it would seem that the construction placed on the alleged malpractice of the defendant physician in this case is too narrow.

In this case, said the Court, it was the defendant's duty to diagnose the cause of the patient's ailments and to treat them in the manner usually done by physicians in his locality. The physician, according to the allegations of the petition, did not give the patient such examination as would be required in such case and declined to give him a roentgen examination but continued to diagnose and treat the patient for lumbago, and by so doing the plaintiff's spinal column and the sacroiliac joint became deformed, stiff and enlarged. The patient was under observation and treatment by the defendant physician for five months. The diagnosis referred to was a continuing biweekly one, and each time an incorrect diagnosis was made and an incorrect treatment applied, the plaintiff's injuries were extended. It was not the error in the diagnosis originally made by the defendant but the adherence to the original diagnosis and course of treatment based on that diagnosis that brought about the injuries. The reason for the holdings in the line of cases last referred to, as exemplified by the Minnesota case *Schmitt v. Esser*, is that it is just to the attending physician that he may not be harassed by premature litigation instituted to save the right of the patient in the event that there should be substantial malpractice. The physician must have all reasonable time and opportunity to correct the evils which made the observation and treatment necessary and to correct the ordinary and usual mistakes incident to even skilled surgery. The doctrine announced in those cases is conducive to that mutual confidence which is highly essential in the relation between surgeon and patient. The treatment and employment should be considered as a whole, and if there occurred therein malpractice, the statute of limitations should begin to run when the treatment ceased. Especially is this true in a situation, such as is presented in this case, in which the patient's condition required treatment rather than surgery.

The Court accordingly held that the statute of limitations, in this case, did not begin to run until Aug. 15, 1938, when the treatment of the patient by the defendant physician ceased, and that the statute did not operate as bar until Aug. 15, 1940. Hence, since the petitions were filed before that date, the trial court was in error in sustaining the demurrer. The action of the trial court was reversed and the cause was remanded for trial.—*Williams v. Elias*, 1 N. W. (2d) 121 (Neb., 1941).

Society Proceedings

COMING MEETINGS

- American Association of Anatomists, New York, April 1-3 Dr. Eliot R. Clark, Dept. of Anatomy, University of Pennsylvania School of Medicine, Philadelphia, Secretary.
- American Association of Industrial Physicians and Surgeons, Cincinnati, Apr. 13-17. Dr. Edward C. Holmblad, 28 East Jackson Blvd., Chicago, Managing Director.
- American Association of Pathologists and Bacteriologists, St. Louis, April 2-3. Dr. Howard T. Karsner, 2085 Adelbert Rd., Cleveland, Secretary.
- American Physiological Society, Boston, March 30 April 4. Dr. Carl J. Wiggers, 2109 Adelbert Rd., Cleveland, Secretary.
- American Society for Experimental Pathology, Boston, April 1-3. Dr. Harry P. Smith, Medical Laboratory Bldg., Iowa City, Secretary.
- American Society for Pharmacology and Experimental Therapeutics, Boston, March 31 April 4. Dr. Raymond N. Dieter, University of Minnesota Medical School, Minneapolis, Secretary.
- American Society of Biological Chemists, Boston, Apr. 7. Dr. A. K. Balls, Bureau of Agricultural and Engineering Chemistry, Washington, D. C., Secretary.
- American Surgical Association, New Orleans, Apr. 6-8. Dr. Charles G. Mixer, 319 Longwood Ave., Boston, Secretary.
- Central Surgical Association, Chicago, Feb. 27-28. Dr. George M. Curtis, Ohio State University, Columbus, Ohio, Secretary.
- Federation of American Societies for Experimental Biology, Boston, March 31-April 4. Dr. D. R. Hooker, 19 West Chase St., Baltimore, Secretary.
- Florida Medical Association, Palm Beach, Apr. 13-15. Dr. Stalter Richardson, 111 West Adams St., Jacksonville, Secretary.
- Iowa State Medical Society, Des Moines, Apr. 15-17. Dr. Robert L. Parker, 3510 Sixth Ave., Des Moines, Secretary.
- Tennessee State Medical Association, Memphis, Apr. 14-16. Dr. H. H. Shoulders, 706 Church St., Nashville, Secretary.
- Tri-States Medical Association of the Carolinas and Virginia, Greenville, S. C., Feb. 23-24. Dr. J. M. Northington, 804 Professional B'g., Charlotte, N. C., Secretary.

Current Medical Literature

AMERICAN

The Association library lends periodicals to members of the Association and to individual subscribers in continental United States and Canada for a period of three days. Three journals may be borrowed at a time. Periodicals are available from 1932 to date. Requests for issues of earlier date cannot be filled. Requests should be accompanied by stamps to cover postage (6 cents if one and 18 cents if three periodicals are requested). Periodicals published by the American Medical Association are not available for lending but can be supplied on purchase order. Reprints as a rule are the property of authors and can be obtained for permanent possession only from them.

Titles marked with an asterisk (*) are abstracted below.

American J. of Digestive Diseases, Fort Wayne, Ind. 8:443-474 (Dec.) 1941

Problems Encountered in Use of Aluminum Hydroxide Gel by Nasogastric Drip in Treatment of Peptic Ulcer. G. H. Drumheller, Pittsburgh.—p. 443.

*Prompt Feeding Program for Bleeding Gastric and Duodenal Ulcer: Report on Thirty-Two Cases and Analysis of 1,396 Recorded Cases. J. T. L. Nicholson and T. G. Miller, Philadelphia.—p. 446.

Withdrawal of Chloride from Blood by Gastric Glands. F. D. Mann, J. H. Grindlay and F. C. Mann, Rochester, Minn.—p. 451.

Value of Meat as Antiscorbutic. V. E. Levine, Omaha.—p. 454.

*Occurrence of Avitaminosis A in Diseases of Liver. M. G. Wohl and J. B. Feldman, Philadelphia.—p. 464.

Effect of Antuitrin S and Posterior Pituitary Extract on Cinchophen Ulcers in Dogs. B. Slutsky, C. M. Wilhelmj and M. Stoner, Omaha.—p. 469.

Effect of Elevated Metabolism on Rate of Intestinal Contractions. M. J. Oppenheimer and N. M. Glyer, Philadelphia.—p. 471.

Rate of Rhythmic Contraction of Small Bowel of Rabbits as Influenced by Experimentally Produced Hyperthyroidism. K. B. Castleton, Salt Lake City, note by W. C. Alvarez, Rochester, Minn.—p. 473.

Prompt Feeding for Bleeding Ulcer.—Nicholson and Miller applied during the past three years the principle of prompt feeding in bleeding ulcer proposed by Meulengracht in 1933. They report 32 consecutive cases of grossly bleeding gastric, duodenal or gastrojejunal ulcer, including 2 of diffuse erosive or ulcerative gastritis, with an analysis of 1,396 recorded cases. Meulengracht's original diet contained a generous supply of bland food and sliced and ground meats. Many physicians were led to believe that this diet, especially the meat ingredient, is an important feature of the treatment. Meulengracht, however, has pointed out that the principle he proposed is that of prompt feeding and that the type of diet is of secondary importance. The authors therefore, included in their series and in that collected from the literature all cases in which feeding was done during hemorrhage, irrespective of the nature of the diet. An analysis of 1,396 cases of gross bleeding from gastric or duodenal ulcer in which treatment was with prompt feeding and a reasonable amount of fluid showed a gross mortality of 3.1 per cent and a net mortality of 1.9 per cent. These results are far better than those for any other type of treatment, medical or surgical. Morphine should be strictly avoided because of its depressing effect on the tonicity of the musculature of the duodenum and probably also of the stomach. The prompt feeding therapy probably is effective because it meets nutritional demands, supplies fluids to counteract shock, neutralizes the gastric acidity (thus preventing further erosion in the area of the ulcer) and increases intragastric and intraduodenal pressure, thus tending to close the open and bleeding vessel.

Avitaminosis A in Diseases of Liver.—Wohl and Feldman record further observations on the occurrence of vitamin A deficiency in patients with hepatic disease in whom jaundice was a significant clinical manifestation. The method used for determining vitamin A deficiency consisted in measuring the ability of the patient to adapt himself to darkness. The dark adaptation test for vitamin A deficiency was utilized for 36 patients with various forms of hepatic disease. The results show that this procedure is of value in the estimation of hepatic parenchymal damage with the inference that such a process is associated with a change in vitamin A metabolism. Jaundice of itself had no particular effect on dark adaptation. The prothrombin level did not parallel the dark adaptation in 50 per cent of the cases investigated, although the tests of hepatic function and the dark adaptation were indicative of hepatic damage.

The usual laboratory and clinical estimations of hepatic function may be augmented by the routine use of the dark adaptation test with certain qualifying points, such as absence of intrinsic retinal disease, of gastrointestinal disturbances interfering with absorption or adequate vitamin A intake, among others.

American Journal of Surgery, New York 54:587-810 (Dec.) 1941

*Juvenile Osteochondral (Chondroepiphysitis) Hypothyroidism. R. L. Schaefer and F. H. Purcell, Detroit.—p. 589.

Bone Drilling in Resistant Chronic Ulcers: New Principle. F. H. Albee, New York.—p. 605.

Differential Diagnosis of "Painful Hip" in Childhood. P. C. Colonna, Oklahoma City.—p. 609.

Primary Bronchogenic Carcinoma of Lung: Clinical and Roentgen Study of Thirty-Eight Cases Over Period of Twelve Years. H. A. Olin and C. A. Elliott, Chicago.—p. 614.

Pathology of Appendical Stump with Suggestions for Prophylaxis. V. L. Schragar, Chicago.—p. 629.

Emergency Control of Postpartum Hemorrhage: Experience with Supplementary Technic. C. C. Briscoe, Philadelphia, and R. A. Wilson, Brooklyn.—p. 634.

Treatment of Pelvic Infection by Iontophoresis of Choline Compound. A. H. Rosenthal, Brooklyn.—p. 639.

Surgical Treatment of Axillary Hidrosadenitis Suppurativa. H. B. Macey, Rochester, Minn.—p. 643.

Postoperative Gastric Drainage: Quantitative Study for Indication of Reestablishment of Gastrointestinal Motility Following Gastric Operations. J. P. Warbasse Jr., New Bedford, Mass.—p. 648.

Prevention of Postoperative Meningitis by Intracranial Implantation of Powdered Sulfanilamide. Y. D. Koskoff and N. M. Wall, Pittsburgh.—p. 653.

Biochemical Aspects of Preoperative and Postoperative Treatment: Its Practical Application. R. Green, Chicago.—p. 659.

*Peritoneoscopy, with Special Reference to Widening Its Applications. J. E. Hamilton, Louisville, Ky.—p. 668.

Healing of Operative Wound in Syphilitic Women. H. C. Falk and I. Kempner, New York.—p. 674.

Congenital Duodenal Obstruction. R. O. Lyday, Greensboro, N. C.—p. 678.

Postoperative Evisceration: Résumé of Literature and Report of Five Cases. M. L. Bobrow, New York.—p. 682.

Ultraviolet Irradiation of Autotransfused Blood in Treatment of Puerperal Sepsis. E. W. Rebbuck, Pittsburgh.—p. 691.

Treatment of Surgical and Traumatic Shock with Citrated Plasma-Saline Mixture. C. S. White, J. L. Collins and J. J. Weinstein, Washington, D. C.—p. 701.

New Operative Procedure for Dupuytren's Contracture. E. L. Stern, New York.—p. 711.

Preparation of Superficial Wounds for Skin Grafting by Local Use of Sulfanilamide and Sulfanilamide Allantoin Ointment. J. R. Veal, R. G. Klepser and M. P. DeVito, Washington, D. C.—p. 716.

Use of Plaster Slipper in Management of Simple Fractures of Toes. J. E. Macmanus, Cooperstown, N. Y.—p. 721.

Juvenile Osteochondral Hypothyroidism.—Schaefer and Purcell contend that the so-called juvenile chondroepiphysitis is due neither to an inflammatory process nor to vascular changes but to hypothyroidism with the consequent lack of its tissue differentiating factor. The confusing terminology, consisting of proper names which are related to the various joints involved and which designate for each a separate clinical entity, should be done away with entirely and the term chondroepiphysitis changed to "osteochondral hypothyroidism." In an earlier report the authors pointed out that 91 of 258 patients with endocrinopathy presented characteristic chondroepiphysial changes. Of these 91 all but 5 had primary or secondary signs of hypothyroidism, such as mental retardation, characteristic structural changes, delay in the time of appearance of osseous centers, increase in the blood cholesterol and decrease in the basal metabolic rate. The following endocrine diagnoses were noted: hypothyroidism, adiposogenital pituitarism, pituitary dwarfism and eunuchoidism. The osseous changes were revealed by roentgenographic studies, which the authors deem a most important diagnostic procedure in endocrine disorders. Characteristic chondroepiphysial changes are occasionally revealed by roentgenoscopy in apparently normal children. The authors believe that this is a sign of deficient thyroid function which has prevented proper epiphysial differentiation. Therefore, regardless of the clinical syndrome patients exhibiting such characteristic bone changes should be considered as hypothyroid and treated with desiccated thyroid to bring about normal bone differentiation. The authors report on 27 patients with juvenile osteochondritis. The disturbances had been classified as Perthes' disease, slipping of the upper femoral epiphyses, Osgood-Schlatter disease,

apophysitis, Köhler's disease or epiphysitis of the spine. The ages ranged from 5 to 15 years. Every patient routinely received desiccated thyroid orally in full therapeutic doses. In addition, patients displaying other signs of endocrine dysfunction, such as late descent of the testicles and delay in adolescence, were treated with the pituitary sexlike hormone. An attempt was made to correct obesity when it was present. Immobilization was not necessary, except in a case of Osgood-Schlatter disease. Hospitalization was not required, and the expense was reduced to a minimum. Normal ossification of the epiphyses was accelerated, as indicated by subsequent roentgen ray examinations. Clinical cure was rapid.

Peritoneoscopy.—Peritoneoscopy, according to Hamilton, no longer requires introduction or apology. Its safety, simplicity and accuracy in diagnosis have been demonstrated by Ruddock, Benedict, Thieme, Olim and others. There are now over three hundred peritoneoscopes in use throughout this country, the Ruddock being the most widely accepted. The author reports his experiences with eighty peritoneoscopies made for 75 patients in the diagnosis of a variety of conditions. In 68 instances a problematic diagnosis was confirmed or changed or new and significant information added. Laparotomy was obviated seventeen times and was definitely elected in 11 instances when the indication for operation was in doubt. The opinion seems to prevail that the method should not be employed in cases of acute inflammatory or other serious conditions in which an adverse outcome might be attributed to the instrumentation. Yet if peritoneoscopy in such a case can spare the patient the much more serious exploratory laparotomy and at the same time help one establish a diagnosis or decide whether operative intervention is indicated, it surely is justified. If surgical intervention should be found necessary this preliminary procedure will not have added significantly in time or trauma to the operation. New or little exploited indications for peritoneoscopy are advanced: (1) differential diagnosis of jaundice; (2) differentiation between bleeding peptic ulcer and ruptured esophageal varix; (3) differential diagnosis of appendicitis and salpingitis; (4) the question of whether a gunshot or a stab wound of the abdomen is penetrating, and (5) rupture of a follicular cyst of the ovary in a woman with uterine bleeding in whom other measures short of surgical intervention have failed.

American Review of Tuberculosis, New York

44:637-780 (Dec.) 1941

- Civilian Health as Factor in National Defense. K. E. Miller, Fort Sam Houston, Texas.—p. 637.
- Pulmonary Tuberculosis: Its Exclusion from Navy. R. E. Duncan, Washington, D. C.—p. 651.
- *Tuberculosis in Army: Tuberculosis Problem of World War No. 1 and in Present Mobilization. W. C. Pollock, Denver.—p. 658.
- *Sources of Infection in Tuberculosis Case Finding: Report of Experience. G. E. Harmon and B. H. Douglas, Detroit.—p. 675.
- *Tuberculosis Among Nurses: Study of Effect of Tuberculosis Service on Incidence of Tuberculous Infection and Disease Among Student Nurses. D. R. Hastings and B. G. Behn, Oak Terrace, Minn.—p. 681.
- Tuberculin Tests in British Guiana. O. M. Francis.—p. 695.
- Temperature Curve in Intestinal Tuberculosis Complicating Chronic Pulmonary Tuberculosis. E. Rosencrantz and Angela M. Piscitelli, San Francisco.—p. 704.
- Medlar Index in Pulmonary Tuberculosis. W. S. Stanbury and M. Viola Rae, Hamilton, Ont., Canada.—p. 710.
- Tuberculosis of Ribs. J. D. Wassersug, Middleboro, Mass.—p. 716.
- Single Cannula Pneumolysis: Further Developments in Instruments and Technique. J. W. Cutler, Wawa, Pa.—p. 722.
- Treatment of Empyema: Treatment of Tuberculous and Mixed Infection Empyema with Bactericidal Substance Reinforced with Wetting Agents. S. A. Petroff, Myron Herman and L. Palitz, Staten Island, N. Y.—p. 738.
- Guinea Pig Inoculation and Culture: Disagreement Between Two Methods Due to Random Sampling. W. N. Berg, New York.—p. 757.

Tuberculosis in the Army.—Pollock believes that the mobilization survey of 1941 to 1945 will be the greatest tuberculosis case-finding effort ever carried out in this country. The survey will consist of a physical examination, a roentgen examination of the chest, the disposition of soldiers with tuberculosis and the notification of proper health authorities. Essentially the same program will be carried out on demobilization. Up to now the 14 by 17 inch (35 by 43 cm.) film has been used for roentgen study of the chest, but at present and in the future the 4 by 5 inch (10 by 12.7 cm.) fluorogram will be used.

Two exposures will be made; one will be sent to the War Department as a permanent record. On demobilization, two fluorograms will be taken and similarly disposed of. The tentative plan for the disposition of men with tuberculosis is as follows: 1. Enlisted men in whom tuberculosis develops in line of duty (service of six months or more, unless the tuberculosis is acute) will be discharged from the Army and transferred to Veterans Administration facilities. 2. Enlisted men showing evidence of pulmonary tuberculosis in excess of that acceptable for military service when surveyed will be discharged to their own care if hospitalization is not needed. 3. Men nearing retirement and noncommissioned officers of the three higher grades with a favorable prognosis for return to military service within one year may be retained in service at Army hospitals. 4. Men in need of hospitalization, regardless of line of duty or physical status, may be hospitalized in specific Army hospitals. The author advocates the rejection of men with roentgen evidence of the reinfection type of tuberculosis. Healed reinfection tuberculosis can soon become reactivated under the conditions of military service. He presents case histories which show that pulmonary tuberculosis can develop shortly after the induction of a man into service although the roentgenogram of the chest was negative on entrance into service. The tuberculosis survey of young adults eliminates tuberculosis from the group only for the moment. The Army tuberculosis survey has been improved recently; roentgenograms of practically all selectees are taken prior to their induction into the Army, and those with tuberculosis are not enrolled.

Sources of Tuberculous Infection.—Harmon and Douglas satisfactorily examined (by means of a tuberculin test which gave a negative result or by roentgen study) 747 family associates of 405 persons with noninfectious tuberculosis in an attempt to discover the sources from which the 405 might have obtained their infection. The examination revealed that among 747 persons there were 26 with the active adult type of tuberculosis whose condition was diagnosed for the first time. The 26 persons may well have been the sources from which the members with noninfectious tuberculosis obtained their infection. The conclusion is apparent that sources of infection must be searched for and that the endeavor may be almost as productive as the search for tuberculous infection among contacts.

Tuberculosis Among Nurses.—Hastings and Behn determined the tuberculosis rate among 706 student nurses in six different hospitals in Minneapolis. None of the hospitals have a tuberculosis service, and none knowingly admit tuberculous patients. Three of the hospitals had affiliation with Glen Lake Sanatorium. The student nurses in two of these three hospitals spent six weeks at the sanatorium on tuberculosis service and those of the third hospital twelve weeks. The first class studied entered training in the spring of 1929 and the last in the fall of 1935. Of the 706 girls 155, or 22 per cent, have not replied to any questionnaire; thus 78 per cent have been followed one and five-tenths to eight and five-tenths years since they left training, or an average of four years. The incidence of infection (reaction to tuberculin) and of tuberculosis was no higher for girls about to enter training than for any similar group of young women. The infection rate (change from a negative to a positive reaction to tuberculin) was about 11.6 per cent higher for the nurses who spent part of their training period on tuberculosis service. The morbidity rate was also higher (18 as against 12 per thousand for the group who did no tuberculosis service), but the available data do not make this difference significant. At the beginning of the girls' training period the roentgenograms of 96.3 per cent were normal. At the end of three years of training the percentage was 93.3 for nurses who did tuberculosis service and 94.8 for those who did not. The morbidity rate was somewhat higher for all the nurses than the 1.5 per cent reported for young women in general. To date clinical tuberculosis has developed in 2.2 per cent of the 703 girls who were allowed to enter training. The incidence for the nurses who gave a negative reaction to tuberculin on entrance was more than three times that for those who reacted to tuberculin on entrance. There were 28 nurses with the adult type of tuberculosis, and 1 of these (a girl with a diagnosis of tuberculosis on entrance who was dismissed immediately) died. The tuberculosis of 9 was discovered during training; in 7 the

tuberculosis was minimal, in 1 it was unclassified and 1 had pleurisy with effusion. Of the 14 whose condition was discovered after they had left training, the disease in 10 was minimal, in 3 it was moderately advanced and 1 had pleurisy with effusion (possibly tuberculous). Although the incidence among nurses is higher than that among young women in general, the disease is discovered in the earlier stages and the mortality is lower.

Archives of Dermatology and Syphilology, Chicago 44:983-1194 (Dec.) 1941

- *Hyposensitization to Poison Ivy. B. Shelmire, Dallas, Texas.—p. 983.
Sulfonated Oil as Detergent: Its Use in Dermatologic Ward. C. G. Lane and I. H. Blank, Boston.—p. 999.
- *Treatment of Lupus Erythematosus with Bismarsen. R. S. Weiss, A. H. Conrad, A. H. Conrad Jr. and R. O. Pfaff, St. Louis.—p. 1009.
- *Kahn Verification Test: Appraisal of Test Based on Clinical and Serologic Evidence. L. Chargin and C. R. Rein, New York.—p. 1031.
- Fox-Fordyce Disease: Report of Case. W. F. Spiller and E. B. Ritchie, Galveston, Texas.—p. 1051.
- Massive Arsenotherapy by Continuous Intravenous Drip Method: Treatment of Acute Syphilis of Rabbits. J. A. Kolmer, with technical assistance of Anna M. Rule, Philadelphia.—p. 1055.
- Nummular Eczema: Its Clinical Picture and Successful Therapy. P. Gross, New York.—p. 1060.
- Avoidance of Fatal Complications in Therapeutic Malaria. U. J. Wile and L. K. Mundt, Ann Arbor, Mich.—p. 1078.
- Alopecia Liminalis Frontalis: Comment on Causation and Report of Four Cases. G. A. Spencer, New York.—p. 1082.
- Poikilodermatomyositis: Report of Case with Complete Postmortem Examination. R. C. Horn Jr., New York.—p. 1086.
- Mesquite Wood Dermatitis. E. C. Fox, Dallas, Texas.—p. 1098.
- Effect of Sulfanilamide and Its Derivatives on Fungi: Preliminary In Vitro Experiments. G. M. Lewis and Mary E. Hopper, New York.—p. 1101.

Hyposensitization to Poison Ivy.—According to Shelmire, persons susceptible to poison ivy usually show a monovalent sensitivity. Since in these persons the criteria for proof of reduced cutaneous sensitivity can be easily controlled during actual clinical exposure, a study of hyposensitization to this plant was undertaken. Ingestion of approximately 2 cc. of a stable and potent poison ivy leaf oil is necessary to reduce the cutaneous sensitivity of the average person from the clinical to the subclinical level. The routine procedure was oral administration of 1 ounce (30 cc.) each of the 1:100, the 1:50 and, finally, the 1:25 dilution of the oleoresin in corn oil during a period of approximately eight months. The present study was undertaken to determine the reduction in cutaneous sensitivity afforded by the ingestion of 1 ounce of 1:25 or 1:10 dilution of a leaf or root oleoresin. Twenty persons sensitive to poison ivy ingested during a period of several months 1 ounce of a 1:25 or 1:10 dilution of poison ivy leaf or root oleoresin in corn oil. Pretreatment and post-treatment quantitative patch tests demonstrated that varying degrees of reduction of cutaneous sensitivity followed ingestion of the specific oil. No reduction of the level of sensitivity of the skin occurred in untreated controls. The results of oral therapy paralleled those usually attained in the percutaneous treatment of asthma and hay fever, satisfactory clinical results being attained in some cases and unsatisfactory results in others. Clinical exposures and repeated testing of the skin with dilutions of the oleoresin in corn oil did not result in an increase in the level of cutaneous sensitivity of the majority of persons hyposensitized by oral therapy.

Treatment of Lupus Erythematosus with Bismarsen.—According to Weiss and his associates, the treatment of the discoid type of lupus erythematosus with gold salts has not been entirely satisfactory. Since Schamberg's introduction of the use of gold sodium thiosulfate, it has been recognized that the disease may yield to treatment not only with gold salts but with other compounds of heavy metals. The authors have seen the condition clear up from the use of bismuth salicylate, sodium or potassium bismuth tartrate, acetarsone and even arsenic trioxide, in the form of "asiatic capsules." They felt that the use of heavy metals in combination might be worthy of trial and selected a familiar combination of arsenic and bismuth, bismuth arspenamine sulfonate (bismarsen). The authors review a series of 28 patients with discoid lupus erythematosus whom they treated with bismarsen. The contraindications to the use of bismarsen are cachexia, severe anemia, endocrine

disturbances, advanced tuberculosis of the lungs, cardiac insufficiency, hemorrhagic disease, epilepsy and severe renal dysfunction. The regimen employed was as follows: The tolerance of the patient was tested by giving 0.05 Gm. of the drug twice weekly for one week. The dose was then raised to 0.1 Gm. twice weekly, and in many cases after the drug was found to be well tolerated the dose was raised to 0.2 Gm. twice weekly. All injections were given intramuscularly. Fourteen of 28 patients treated with bismarsen made an apparent recovery, 12 patients showed improvement and 2 patients showed no improvement. The authors conclude that bismarsen may be of value in the treatment of discoid lupus erythematosus but that more patients must be treated before its use can be adequately evaluated. Insufficient time has elapsed for one to estimate the permanence of the results. Reports about blood dyscrasias after treatment with bismarsen induced the authors to make frequent blood counts. In 5 cases the leukocyte count dropped below 5,000. When this was the case either medication was discontinued or the dose was cut. Since nitritoid reactions may occur the patient should be observed for at least one-half hour after the drug is injected. The significance of this report lies not so much in the results reported but in the fact that a combination of heavy metals in the form of a double salt may cause involution of the lesions of discoid lupus erythematosus. This may lead to further experimentation with other combinations of metals, leading perhaps to the discovery of less toxic and more effective drugs.

Kahn Verification Test.—Chargin and Rein point out that there are no truly specific tests for syphilis. The lipids employed in the various tests are not antigens in the strict biologic sense. They are, however, capable of producing reactions which are diagnostic of syphilis to a high degree. All tests so far devised may give a negative reaction in the presence of syphilis and a positive reaction in its absence. Antepartum and premarital tests must have enormously increased the number of persons now being needlessly subjected to therapy. Kahn described three basic types of reactions with the verification test: 1. The syphilitic type, which occurs when precipitation is greater at 37 than at 1 C.; this usually corresponds to positive reactions (to serodiagnostic tests) associated with syphilis. 2. The general biologic (nonsyphilitic) type, occurring when precipitation is greater at 1 than at 37 C.; this usually corresponds to a positive reaction (to serodiagnostic tests) associated with nonsyphilitic conditions. 3. The negative type, which occurs when there is no precipitation at 1 or at 37 C. and usually corresponds to a negative serodiagnostic reaction. When the results of the verification tests are irregular, so that they cannot be classified with any of these three types, the reactions are referred to as "inconclusive." The reaction to the Kahn verification test was studied for 1,565 persons with various conditions, comprising syphilis, nonsyphilitic dermatoses, questionable conditions, pregnancy, contagious diseases, pinta, malaria, leprosy and other conditions. In the group of 349 syphilitic patients who had received varying amounts of treatment the verification test gave the syphilitic type reaction in 100 per cent of those with a strongly positive serodiagnostic reaction, in 76.5 per cent of those with a weakly positive reaction and in 40.2 per cent of those showing a doubtful reaction. There was no reaction of the syphilitic type in the patients with a negative serodiagnostic reaction. The incidence of the general biologic type of reaction to the verification test in the group with a negative serologic reaction was 7.1 per cent and in the group with a doubtful serologic reaction 12.1 per cent. In the nonsyphilitic group (269 in number) there were but 2 patients who had a syphilitic type of reaction to the verification test. The diagnosis of syphilis could not be established for these patients. The incidence of biologic reactions in this group varied from 13.8 to 47.6 per cent. In the questionable group (of 253 members) 83 patients (32.7 per cent) gave a syphilitic type of reaction to the verification test. Further study is necessary to determine whether they actually have syphilis. The incidence of the general biologic (nonsyphilitic) type of reaction in this group varied from 2.3 to 38.6 per cent. Of the patients with acute contagious diseases the general biologic (nonsyphilitic) type of reaction to the verification test was obtained in 29.3 to 64 per cent, and of the pregnant women this type of reaction

was obtained in 21.2 to 55.5 per cent. The highest incidence of the general biologic (nonsyphilitic) type of reaction was associated with the doubtful serodiagnostic reactions in all groups. The percentage of the syphilitic type of reaction to the verification test increases with the increase in the titer of serodiagnostic reaction. In the group of 268 patients with pinta, all of whom gave strongly positive serodiagnostic reactions, 83.9 per cent gave a syphilitic type of reaction to a verification test. Agreements as well as discrepancies were observed in a number of blood specimens that were subjected to repeated verification tests.

Archives of Internal Medicine, Chicago

68:1043-1254 (Dec.) 1941

*Elliptic Erythrocytes in Man. Helen Wyandt, Omaha; P. M. Bancroft, Lincoln, Neb., and T. O. Winship, Rizal, Philippine Islands.—p. 1043.

*Efficacy of Intravenous Sodium Bicarbonate Therapy in Treatment of Diabetic Ketosis. L. B. Owens, J. Wright and Edna Brown, Cincinnati.—p. 1066.

Rheumatic Pneumonia. E. Z. Epstein and E. B. Greenspan, New York.—p. 1074.

*Tuberculum of Hypophysis with Insufficiency of Anterior Lobe: Clinical and Pathologic Study of Two Cases. J. D. Kirshbaum and H. A. Levy, Chicago.—p. 1095.

Metabolism in Organic Hyperinsulinism: II. Effects of Epinephrine on Glycemic Level and on Combustion of Carbohydrate. J. W. Conn and Elizabeth Stern Conn, Ann Arbor, Mich.—p. 1105.

Id.: III. Effects of Adrenal Cortical Extract on Blood Sugar and on Sodium and Nitrogen Equilibrium. J. W. Conn and Elizabeth Stern Conn, Ann Arbor, Mich.—p. 1115.

Hypothermia: Report of Case in Which Patient Died During Therapeutic Reduction of Body Temperature, with Metabolic and Pathologic Studies. J. H. Talbott, W. V. Consolazio and L. J. Pecora, Boston.—p. 1120.

Therapy of Tetanus: Study of 276 Cases. R. Spaeth, Chicago.—p. 1133.

Biologic False Positive Serologic Reactions in Tests for Syphilis: II. Occurrence with Organic Diseases Other Than Syphilis. C. F. Mohr, J. E. Moore and H. Eagle, Baltimore.—p. 1161.

Pulmonary Cavitation Associated with Coccidioidal Infection. W. A. Winn, Springville, Calif.—p. 1179.

Prognostic Value of Various Clinical and Electrocardiographic Features of Acute Myocardial Infarction: II. Ultimate Prognosis. S. A. Levine, Boston, and F. F. Rosenbaum, Ann Arbor, Mich.—p. 1215.

Review of Neuropsychiatry for 1941. S. Cobb, Boston.—p. 1232.

Elliptic Erythrocytes.—Wyandt and her associates report the observation of elliptic erythrocytes in 86 members of three interrelated German families. There were definitely more males with the anomaly than without it, and more males were affected than females, especially when the father was the affected parent. In one instance both parents had the anomaly. From their mating there were 2 sons with round cells and 1 daughter with elliptic cells, spherocytes and other evidences of hemolytic icterus, and 2 sons died before the study was begun. Of two pairs of twins, 1 of a fraternal pair had elliptic cells and the other had not. Of the other pair, 1 died at the age of 11 months and the living twin showed the anomaly. Sections of tissue made at necropsy of the twin who died showed only round cells. The constancy of shape of the cells was established by daily counts on 1 subject during his stay in a hospital for three and a half weeks. The percentage of elliptic cells varied from 88 to 92 and that of the sausage-shaped cells from 17 to 25. The authors were unable to substantiate the assertion by Terry and his associates that elliptic erythrocytes settle more readily, are heavier and are less fragile than normal erythrocytes. All but 1 of the subjects were singularly free from anemia, and the individual family members were unusually healthy and long lived. The exception was a child both of whose parents had elliptic cells in large numbers. The erythrocyte count of this child was 4,200,000 and the hemoglobin concentration 9.8 Gm. per hundred cubic centimeters. Except for the increased fragility the blood picture of the child was similar to that in hypochromic anemia, with elliptocytosis and poikilocytosis. The definite occurrence in the blood of this child of elliptic cells and of spherocytes suggests the simultaneous occurrence of the two anomalies, even though spherocytes were not present in the blood of either parent. The fact that both parents are elliptic cell bearers may have some bearing. With 3 exceptions, 2 of them involving children, the mean corpuscular volume, hemo-

globin and hemoglobin concentration of the persons examined were within normal limits. In the 3 cases there was slight microcytosis. This led the authors to think that slight polycythemia might accompany elliptocytosis. The cause of the anomaly is unknown. The change to the elliptic shape takes place during or after the reticulocyte stage and is inherent in the structure of the cell itself. The elliptic cell is a form of old erythrocyte—an end stage—since a few of these cells are present in the blood of all normal persons. Recent reports indicate that the anomaly is more common than is generally believed. The authors say that during the four years in which their study has been in progress they encountered 2 additional cases in approximately seven thousand examinations. The anomaly has been reported for almost every people except the Chinese, Japanese and Hindus, with a preponderance among the Germans. Elliptocytosis is transmitted as a simple mendelian dominant unit character. The family in which both parents and 1 child show the anomaly and 2 children do not proves that the anomaly could not be a recessive characteristic. Although rare, elliptocytosis might aid in the identification both of person and of paternity. Since the anomaly is easily recognized it should be valuable in linkage studies of various inherited characteristics.

Diabetic Ketosis.—According to Owens and his co-workers, the problem of death from diabetic ketosis is not solved by correcting the content of blood sugar and blood ketones and the carbon dioxide combining power. The mental state, the duration of mental symptoms, the amount of treatment, the age of the patient, circulatory collapse and infection all play a part in recovery. The authors considered the foregoing factors and compared the mortality among patients treated with sodium bicarbonate with that for patients not so treated to determine whether its administration is practical. Twelve unselected patients with severe diabetic ketosis were given the usual forms of therapy. In addition, 9 were given a 5 per cent solution of sodium bicarbonate intravenously immediately or three hours after admission. The other 3 were used as controls. In the 3 control patients the carbon dioxide combining power rose progressively (15, 15 and 23 volumes per cent respectively) during the nine hours of study after admission to the hospital. The ketones in the blood fell progressively in inverse proportion to the rise of the carbon dioxide combining power. The average rise of the carbon dioxide combining power in the 9 patients given from 15 to 55 Gm. of sodium bicarbonate was more than twice as great as that in the controls, but the results were not consistent. The rise produced no effect on the mental state, the blood pressure, the urinary output or any other vital sign, but Kussmaul respiration was usually relieved before there was any appreciable drop in the level of ketones in the blood. The total urinary output of ketones was measured for 4 patients receiving sodium bicarbonate; the excretion of 3 was less immediately after the medication than during the subsequent three hours. This decrease is significant because in 2 of the 3 patients an increase in the ketones in the blood occurred concomitantly with a lessened amount in the urine. In the fourth patient, the ketones in the blood increased after sodium bicarbonate had been given but the amount in the urine fell progressively. The authors conclude that the intravenous administration of sodium bicarbonate has no antiketogenic action in diabetic ketosis and that it does not facilitate the elimination of ketones that have already accumulated in the blood and urine. Study of the mortality among 154 consecutive patients with diabetic ketosis likewise failed to show any benefit in 47 of the patients given sodium bicarbonate therapy. Of 5 with extremely mild or mild ketosis none died, of 15 with moderately severe ketosis 6 died, of 13 with severe ketosis 6 died and of 14 with extremely severe ketosis 13 died. Of the 107 not given sodium bicarbonate 8 had extremely mild ketosis, and none of these died, and of 18 with mild ketosis 1 died, of 32 with moderately severe ketosis 11 died, of 32 with severe ketosis 15 died and of 17 with extremely severe ketosis 16 died. If the severity of the ketosis is considered there appears to be no difference in the mortality rate among the patients treated with sodium bicarbonate and those given no alkali.

Tuberculoma of Hypophysis.—Kirshbaum and Levy point out that only 2 tuberculomas of the anterior lobe of the hypophysis producing symptoms of pituitary insufficiency were encountered at necropsy in 14,160 cases in the department of pathology of the Cook County Hospital from 1929 to 1940 inclusive. Six hundred and fifty-two cases of various types of pulmonary tuberculosis and 368 of tuberculous meningitis with no hypophysial involvement were observed. The record of the authors' first case of tuberculoma fulfilled the criteria of pituitary cachexia (Simmonds' disease), with the clinical syndrome of amenorrhea, severe asthenia, definite and rapid loss of weight with cachexia, hypotension, dryness of the skin and hair, a low basal metabolic rate and high dextrose tolerance. The picture was completed by total destruction of the anterior lobe of the hypophysis by a tuberculous lesion, with evidence of chronic pulmonary tuberculosis and hypoplasia of the thyroid. In the second case, although pituitary failure was evidenced by a eunuchoid body build with a feminine distribution of hair and hypotension, an old sclerosed tuberculoma of the anterior lobe, with atrophy of the zona fasciculata of the adrenal cortex and possibly the results of pressure on the seventh cranial nerve and the optic chiasm were observed. Hypofunction of the pituitary gland was suspected clinically, particularly in the first case. Tuberculosis, because of its rarity, was not suspected in either case. The hypophysis may be involved by acute miliary spread of the disease, extension from contiguous basilar meningitis or sphenoid osteomyelitis or hematogenous dissemination with latent exacerbation producing conglomerate tubercles. Hypophysial symptoms are not usually associated with the first two types, while the symptoms of the third type depend on the part of the gland and the surrounding structures involved.

Archives of Ophthalmology, Chicago

26:945-1140 (Dec.) 1941

- Keratoconjunctivitis Sicca. G. M. Bruce, New York.—p. 945.
Socket Reconstruction: New Form and Method of Handling Skin Graft. W. L. Hughes, Hempstead, N. Y.—p. 965.
*Ocular Manifestations in Myasthenia Gravis. R. D. Mattis, Boston.—p. 969.
Etiology of Uveitis: Clinical Study of 562 Cases. J. S. Guyton and A. C. Woods, Baltimore.—p. 983.
Unusual Case of Hodgkin's Disease: Preliminary Report. J. W. Avery and J. W. Warren, Hollywood, Calif.—p. 1019.
Krukenberg's Spindle: Study of 202 Collected Cases. W. H. Evans, R. E. Odum and E. J. Wenaas, Youngstown, Ohio.—p. 1023.
Theories of Cataract. J. G. Bellows and H. Chinn, Chicago.—p. 1066.

Myasthenia Gravis.—Mattis suggests that the ocular manifestations in myasthenia gravis are due not to a contracted state of the musculature involved but to some neuromotor dysfunction that is benefited by prostigmine preparations. In this disease the extraocular muscles exhibit "transient tropia" and "drifting phoria," which in some cases are relieved by prostigmine preparations. The pupillary reactions are usually normal and appear to be unchanged by prostigmine therapy. Pronounced refractive errors and changes in visual acuity have not been associated with myasthenia gravis. The accommodative power is usually normal and appears to be unchanged by therapy. The ocular manifestations of myasthenia gravis, the author believes, are more common than is generally thought. The intramuscular injection of prostigmine methylsulfate solution is a valuable diagnostic aid.

Delaware State Medical Journal, Wilmington

13:219-232 (Nov.) 1941

- Treatment of Convulsions. K. M. Corrin, Wilmington.—p. 219.
Purpura Hemorrhagica: Case Report. A. G. Gluckman, Wilmington.—p. 222.

Missouri State Medical Assn. Journal, St. Louis

38:393-426 (Dec.) 1941

- Differential Diagnosis and Treatment of Those Nonhemolytic Anemic States Failing to Respond to Adequate Liver or Iron Therapy. C. A. Doan, Columbus, Ohio.—p. 393.
Modern Control of Pneumonia. H. F. Flippin, Philadelphia.—p. 398.
Development of Prostatic "Hypertrophy." C. L. Deming, New Haven, Conn.—p. 401.
Diagnosis and Treatment of Common Anorectal Conditions. L. S. Fallis, Detroit.—p. 404.

Ohio State Medical Journal, Columbus

37:1133-1232 (Dec.) 1941

- English Medicine and the War. K. C. McCarthy, Toledo.—p. 1149.
Tularemia and Its Treatment with "Lyovac" Antitularemic Serum. G. E. Marr, Hamilton.—p. 1154.
Medical Review of 311 Cholecystectomies and Importance of Diagnostic Nonsurgical Biliary Drainage. A. A. Hall, Columbus.—p. 1156.
Hemochromatosis: Case Report. H. M. Gans and A. Adelman, Cleveland.—p. 1159.
Multiple Myeloma: Report of Case. S. S. Berger and J. I. Goodman, Cleveland.—p. 1163.
Jaundice Complicating Case of Twin Pregnancy. J. L. Bubis and J. I. Goodman, Cleveland.—p. 1167.
Classification of Asthma. J. H. Mitchell and W. F. Mitchell, Columbus.—p. 1171.
Relief of Prostatic Obstruction: Short Review of 132 Consecutive Cases. E. A. Ockuly, Toledo.—p. 1174.
*X-Rays in Treatment of Acne Vulgaris. H. G. Miskjian, Cleveland.—p. 1177.
Occult Carcinoma of Kidney with Metastases Simulating Primary Carcinoma of Nasopharynx. S. Koletsky, Cleveland.—p. 1180.

Roentgen Treatment of Acne Vulgaris.—Miskjian uses the following technic in treating patients with acne vulgaris with roentgen rays: He gives 150 roentgens every two weeks. This is filtered through 0.5 or 1 mm. of aluminum, and the distance from the anode is 10 inches. Three exposures are made, one to each side of the face and one vertically to the forehead. While the face is being treated the forehead is shielded (and vice versa) with a piece of heavy lead rubber. Usually eight treatments are sufficient. The author's rule is to give two roentgen treatments after all the lesions have disappeared. If erythema, no matter how slight, appears, treatment is interrupted for one to two months. After treatment has been completed the patient may remain free from active lesions indefinitely. However, in some patients one or two superficial papules will develop now and then. They resolve fairly rapidly after a period of induration only. To prevent their appearance the use of the "improved" lotio alba, beginning two months after treatment has been completed, is suggested. Patients should be warned of a probable recurrence approximately six months after roentgen treatment. The author believes that these recurrences are less frequent if roentgen therapy is not discontinued as soon as the last lesion vanishes. He does not recommend a second course of roentgen treatments for recurrences, particularly if a total of 1,500 roentgens has been given.

Public Health Reports, Washington, D. C.

56:2189-2232 (Nov. 14) 1941

- Blindness, as Recorded in National Health Survey: Amount, Causes and Relation to Certain Social Factors. R. H. Britten.—p. 2191.
Treatment of Dietary Liver Cirrhosis in Rats with Choline and Casein. J. V. Lowry, F. S. Daft, W. H. Sebrell, L. L. Ashburn and R. D. Lillie.—p. 2216.

56:2233-2276 (Nov. 21) 1941

- Distribution of Health Services in Structure of State Government: Chapter II. Communicable Disease Control by State Agencies. J. W. Mountin and Evelyn Flook.—p. 2233.
Ornithodoros Turicata and Relapsing Fever Spirochetes in New Mexico. G. E. Davis.—p. 2258.

56:2277-2320 (Nov. 28) 1941

- Disease Outbreaks from Water, Milk and Other Foods in 1939. A. W. Fuchs.—p. 2277.
Analysis of Human Tumors Diagnosed at National Institute of Health, 1920-1939. R. D. Lillie.—p. 2284.

Rhode Island Medical Journal, Providence

24:199-216 (Nov.) 1941

- Doctor William Hunter. R. Hammond, Providence.—p. 199.
Management of Pathologic Lesions of Jaws. J. A. Doherty, Boston.—p. 201.
Addison's Disease: Management of Typical Case with Desoxycorticosterone Acetate in Oil and by Pellet Implantation. M. DiMaio, Providence.—p. 203.

South Carolina Medical Assn. Journal, Florence

37:291-316 (Nov.) 1941

- Treatment of Bronchial Asthma and Hay Fever with Cyclopropane. C. A. Sweatman, Columbia.—p. 291.
Intestinal Infestations. H. M. Davison, J. C. Thoroughman and J. B. Peschau, Atlanta, Ga.—p. 294.
Practical Management of Infantile Eczema. L. S. Bryan, Columbia.—p. 298.

FOREIGN

An asterisk (*) before a title indicates that the article is abstracted below. Single case reports and trials of new drugs are usually omitted.

Brain, London

64:93-196 (Sept.) 1941

Experimental Cerebral Concussion. D. Denny-Brown and W. R. Russell. —p. 93.

Spinal Cord Degeneration Produced by Dietary Means. D. Mitchell. —p. 165.

*Familial Cortical Cerebellar Atrophy. B. Hall, K. B. Noad and O. Latham.—p. 178.

Familial Cortical Cerebellar Atrophy.—Hall and his associates discuss the history of a family of 35 persons (four generations) in a number of whom clinical phenomena have developed which generally include extreme ataxia of the lower limbs and difficulties of speech. The difficulties appeared earlier in each generation and progressed slowly to relative helplessness. They were not accompanied by any special sensory disturbances. Relatively late muscular wasting compatible with extreme old age was observed. A postmortem examination of 1 of the patients revealed a remarkably pure form of chronic cortical parenchymatous atrophy of the Purkinje neurons of the cerebellar cortex with secondary involvement of the olivary neurons. The whole picture with its familial and hereditary qualifications resembled Holmes's familial cerebellar atrophy. Seventeen members of the family are children, and so far only 1 of them appears to have been affected at the age of 7. This patient slurs his speech. Of the other 18 members 8 have been affected.

British Journal of Urology, London

13:127-198 (Sept.) 1941

"Essential Hematuria": Are Lesions of Renal Papilla a Frequent Cause? A. Webb-Johnson and W. T. Warwick.—p. 127.

Trigonal Muscle, with Special Reference to Its Composition and Urinary Function. D. Macleod.—p. 135.

*Study of 310 Cases of Enuresis Treated by Urethral Dilatation. H. P. Winsbury-White.—p. 149.

Enuresis Treated by Urethral Dilatation.—Winsbury-White reports on 310 patients with enuresis whom he examined and treated. In a certain number the condition developed suddenly in connection with an inflammation, generally one of the exanthems. In others the complaint became worse after one of these infections. In about half (49 per cent) enuresis commenced during infancy and in 84 per cent began up to the end of the sixth year of life. Enuresis in both sexes is commonly associated with chronic inflammatory changes in the posterior portion of the urethra and at the neck of the bladder. Chronic inflammatory changes in the urethra in the female often are accompanied by a simple form of vulvitis. In the male these changes are sometimes initiated by inflammation at the external urinary meatus. The urine is generally free from evidence of infection, and no specific organism has been detected to explain the inflammatory changes. In many cases there are mild renal changes indicating some slight impairment of function of the kidneys, as shown by intravenous urography. It is exceptional for patients with enuresis not to be benefited by urethral dilatation, provided this treatment is carried out in the proper manner. The author dilates the urethra usually with metal sounds either once or on more than one occasion. He performs the treatment with the aid of general anesthesia. The external genitals are carefully inspected and cleansed. For the male, if deemed necessary, meatotomy is performed next. The caliber of the urethra is estimated; then the cystoscope is passed and the residual urine estimated. Then the dilatation is carried out. In treating boys the author uses a special set of curved metal sounds, marked in the French scale from 2 to 26. The treatment should not be attempted by one not experienced in urethral instrumentation in children. The author found that when repeated dilations were necessary benefit did not result when the intervals were extremely short; the shortest interval should be one month. Most of the dilations were carried out at intervals of one to three months. The author thinks that the fact that it has been established that a mild chronic inflammatory process is present in the posterior portion of the urethra and at the neck of the

bladder in the majority of cases of enuresis is sufficient justification of treatment by urethral dilation. This treatment has long since proved beneficial in many adults with chronic disturbances of micturition due to inflammatory processes in the same localities. In many such cases the history dates from childhood.

Medical Journal of Australia, Sydney

2:465-496 (Oct. 25) 1941

Air Raid Injuries of Chest. T. F. Rose.—p. 465.

Complement Fixation in Influenza with Embryo Fluid as Antigen. M. Foley and F. M. Burnet.—p. 468.

Biochemical Investigation of Tannic Acid and Sulfanilamide Treatment of Burns. J. de Vidas and A. C. McEachern.—p. 470.

Note on Preparation and Use of M and N Testing Fluids. R. T. Simmons, Lucy M. Bryce, J. J. Graydon and H. Wilson.—p. 474.

Improved Methods of Mental Nursing. S. J. Minogue.—p. 476.

2:497-528 (Nov. 1) 1941

Jaundice. A. J. Collins.—p. 497.

Carcinoma of Colon. T. F. Rose.—p. 501.

Chronic Lymphatic Leukemia After Severe Trauma. J. B. Thiersch.—p. 504.

2:529-554 (Nov. 8) 1941

Hospitals: Historical Survey. F. Arden.—p. 529.

Bacillus Tropicus: New Species Isolated from Man and Animals Described and Compared with Other Bacilli Resembling Bacillus Anthracis. W. G. Heaslip.—p. 536.

Percutaneous Treatment of Vitamin K Deficiency. P. Fantl and A. B. Corkill.—p. 540.

Proceedings of Royal Society of Medicine, London

34:757-834 (Oct.) 1941

Amnesic Syndromes in War. W. Sargant and E. Slater.—p. 757.

Form of Visual Disorientation Resulting from Lesions of Right Cerebral Hemisphere. W. R. Brain.—p. 771.

Clinical Significance of Pattern of Cutaneous Innervation. G. Weddell.—p. 776.

*Use of Vitallium in Surgery, with Special Reference to Cup Arthroplasty. W. H. Cole.—p. 779.

Sulfathiazole in Treatment of War Wounds. J. T. Heyl.—p. 782.

Mechanical Fixation of Fractures. C. H. Bradford.—p. 786.

Orthopedic Aspects of Plastic Surgery: Early Replacement of Skin Losses in War Injuries of Extremities. J. M. Converse.—p. 791.

Osteomalacia: Case. Meave Kenny.—p. 801.

Experience with Intravenous Use of Follicle Stimulating Hormone of Anterior Pituitary in Menstrual Disorders. Meave Kenny and Doreen Daley.—p. 804.

Royal College of Physicians of London, on Occasion of Its Recent Bombing. A. P. Cawadias.—p. 811.

Tuberculosis of Knee Joint. F. C. Golding.—p. 823.

Vitallium in Surgery.—Vitallium appears to be a most inert and "silent" metal in the body. Cole has examined two femoral heads of vitallium and microscopic sections from them. One was from a patient who had been walking for nearly six months with a vitallium femoral cup which became defective and had to be replaced. The other was taken from a patient who died one month after operation; no weight bearing and little motion had taken place owing to the condition of the patient. In neither patient did the author observe the cartilage mentioned by Smith-Petersen, and it is probable that its development depends on a longer use of the hip. The cup in the first patient had to be prized from the neck of the femur, all the motion taking place between the cup and the acetabulum. On removal of the cup a beautifully shaped, smooth, bluish surface was exposed which appeared to be cartilaginous but which was covered by an extremely thin membrane extending in from the capsule. Similar changes were present on the surface of the acetabulum. A block of bone removed from the center of the femoral head when examined microscopically showed no cartilage but merely a thin, dense fibrous layer over compact bone. In the second patient the cup was still loose, and the stump of the neck was rounded and smooth with irregular islands of what appeared to be cartilage scattered over its surface. Microscopically, no cartilage was found and the surface was covered with organizing fibrous tissue overlying the bony trabeculae which showed atrophy near the surface. The vitallium cup is indicated for any arthroplasty of the hip by any method, and for many patients with arthritis and joint deformity for whom arthrodesis or osteotomy is ordinarily indicated.

Annales Pædiatrici, Basel

157:129-192 (No. 3) 1941

- *Practical Experiences on So-Called Catarrhal Icterus and Contribution to Its Hematology. E. Ziegler.—p. 129.
Small Epidemic of Pustulosis Varioliformis Acuta. Margrit Esser.—p. 156.
Congenital Pemphigus of Malign Type: Case. O. Brandberg.—p. 162.
*Plasma Phosphatase Titer in Rickets with Particular Reference to Shock Treatment. E. Josefsson.—p. 169.
Determinations of Thyroid Hormone in Connection with "Second Disease" of Scarlet Fever. S. Zimányi.—p. 181.

Catarrhal Icterus and Its Hematology.—Ziegler points out that Flindt in 1890 maintained that the so-called catarrhal icterus is a specific infectious disease. Other authors believed that hepatitis is due not to a specific infection but to an alimentary toxic cause. Icterus simplex, icterus benignus, icterus infectiosus, icterus epidemicus, icterus sporadicus and epidemic hepatitis were some of the terms applied to this entity. The causal organism has never been identified. The author made his investigations on cases of sporadic disease, on small localized epidemics and on a few isolated cases in which the disease originated from endemic foci. His observations indicated that as a rule the disease is transmitted from person to person (probably by droplet infection). From an epidemic in a house in which 5 persons had a manifest and 1 an abortive form of catarrhal icterus the author deduced that the minimal incubation period is twenty-nine days. The prodromal stage is lacking in characteristic symptoms and may be completely overlooked, particularly in adults. In children the prodromal stage often commences with fever and rheumatoid pains in the extremities and the back and throughout the body. At the onset of the stage of generalization central nervous disturbances may develop. When the disease begins with fever catarrhal symptoms of the upper respiratory tract are frequent. Cutaneous changes, in the form of urticaria, may also develop during the prodromal stage. The involvement of the liver is especially characteristic. The demonstration of urobilinogenuria is of differential diagnostic significance if appendicitis is suspected. However, swelling of the liver may occasionally become manifest before the amount of urobilin or urobilinogen in the urine is increased. The author studied the blood picture of 10 patients with fully developed catarrhal icterus and of 5 with the abortive form. He describes the blood picture in the preicteric stage and in abortive catarrhal icterus and discusses the behavior of the sedimentation reaction during the preicteric and the icteric stage. Measurement of the erythrocytes and the determination of the deformation coefficient discloses noticeable macrocytosis without deformation.

Plasma Phosphatase in Rickets.—Josefsson points out that the determination of the phosphatase values constitutes a valuable complement to other investigations in rickets as a criterion of the existence of the disease and to some extent as a gauge of its severity. The phosphatase values constitute a more sensitive indicator than the ordinary phosphorus determinations. Phosphatase determinations are superior to blood phosphorus determinations also in estimating the clinical effect of treatment with vitamin D, particularly when it is given as shock (massive dose) treatment. If the phosphatase value is normal before the treatment, later determinations will show little change. If the phosphatase level is moderately increased (up to about 500 units) a reduction immediately after the treatment probably indicates that the disease is mild or moderately severe. But if the value remains high for some time there is reason to assume that the disease is more severe. Really high values, such as 600 units or more, indicate genuine rickets.

Schweizerische medizinische Wochenschrift, Basel

71:1061-1084 (Sept. 13) 1941. Partial Index

- Clinical Aspects of Chordomas. F. Jenny.—p. 1061.
Lymphoid Glandular Fever. L. Feil.—p. 1071.
Armored Heart with Backflow Stasis. L. Rischoff.—p. 1074.
Modification of Electric Ejaculation Test. C. A. Joël.—p. 1074.
*Pregnancy After Nephrectomy for Renal Tuberculosis. H. Scherer.—p. 1075.

Pregnancy After Nephrectomy.—Observations on 3 cases of pregnancy after nephrectomy for renal tuberculosis gave Scherer an opportunity to consider this problem from the obstetric-gynecologic point of view. Urologists agree that the removal of one kidney for tuberculosis is not a contraindication

to pregnancy, but it has also been pointed out that pregnancy is dangerous as long as some of the clinical signs of tuberculosis are present. The smallest focus of tuberculous infection in the urinary organs may cause a severe relapse during pregnancy. At least three years should have elapsed since the apparent cure of the urinary tuberculosis, and the urine should be free from bacilli, as proved by animal experimentation. Considering the high percentage (60 to 70 per cent) of cure in women who have undergone nephrectomy for tuberculosis, it becomes apparent that pregnancy in these women is not a rarity. The author discusses 3 cases. One death occurred as the result of the pregnancy; in the second case severe nephropathy developed which showed no tendency to subside as late as seven weeks after delivery by cesarean operation; in the third case urinary disturbances led to interruption of the pregnancy after the fifth week. The author does not wish to imply that the presence of only one kidney is an indication for the interruption of pregnancy, but he wishes to direct attention to the danger if the nephrectomy has been done for tuberculosis and a complete cure has not been obtained. He suggests that in some cases, particularly when there are other children and the second kidney is damaged, tubal sterilization might be advisable to prevent further pregnancies and new tuberculous lesions.

Archivos Argentinos de Pediatría, Buenos Aires

16:323-434 (Oct.) 1941. Partial Index

- *Sulfanilamide in Acute Streptococcal Glomerulonephritis. J. P. Garrahan and C. Ruiz.—p. 323.
*Acute Pleural Empyema Without Fever in Infants. S. I. Bettinotti.—p. 360.

Sulfanilamide in Glomerulonephritis.—Garrahan and Ruiz report on the use of sulfanilamide for a child aged 4½ years with acute streptococcal glomerulonephritis and streptococcal meningitis. The diseases developed one month after acute tonsillitis and otitis media. There were hematuria, arterial hypertension and intractable vomiting. The treatment consisted of intraspinal and intramuscular injections of 5 cc. of a 2 per cent sulfanilamide solution. The injections were given every twelve hours for the first forty-eight hours, during which there was evident improvement. Vomiting disappeared. The amount of urine eliminated in twenty-four hours increased to 400 cc. The urine became normal. The cerebrospinal fluid was sterile, although it was still opalescent. Sulfanilamide was then given by mouth only in daily doses of 1.5 Gm. divided into several doses. It was administered for five consecutive days. Recovery followed without sequels. The authors believe that sulfanilamide is indicated in acute nephritis following infection, provided the urine is eliminated in sufficient quantity. Magnesium sulfate is contraindicated in the course of sulfanilamide therapy.

Acute Pleural Empyema in Infants.—Bettinotti directs attention to a type of acute pleural pneumococcal empyema which develops in infants about one month after pneumonia. There is no fever, but the general condition rapidly declines. The predominant symptoms are dyspnea, toxemia and rapid progressive loss of weight. Clinical and roentgenologic examinations demonstrate a large amount of pleuritic fluid. The course of the disease is grave and complicated. The 3 patients seen by the author were between the ages of 6 and 20 months. Two patients were treated by paracentesis followed by intrapleural lavage with a 5 per cent solution of ethylhydrocupreine hydrochloride. Puncture was performed at intervals of six days up to five and seven punctures, respectively. The patients recovered. In the 3 cases the pneumococcus was the causal agent. The author suggests the name acute pleural pneumococcal empyema without fever for the type of disease described.

Medicina, Mexico, D. F.

21:505-548 (Nov. 25) 1941

- *Study of 100 Abnormal Electroencephalograms. R. Vasconcelos.—p. 505.
Vascular Hyperreflexia: Arterial Hypertension as Hyperergic Manifestation in Chronic Infections. T. D. Boquin.—p. 540.

Study of 100 Abnormal Electroencephalograms.—Vasconcelos reports electroencephalographic studies on 100 patients at the General Hospital in Mexico, D. F. The electroencephalograms were obtained mostly from epileptic patients. The records were made in the morning, and, except when the influence of medicines on the electroencephalographic record was to

be studied, the patients were given no sedative, hypnotic, analgesic or anticonvulsive drugs for forty-eight to ninety-six hours before the test. No concordance was found between the form of the epilepsy and the electroencephalographic record as described by Lennox and Gibbs. However, there was a constant direct relationship between the severity of the clinical picture and the abnormalities of the electroencephalogram. The author attempts to classify these abnormalities into three forms: (1) mild epilepsy, "paroxysmal hypersynchrony" of Jasper, or petit mal, (2) moderate epilepsy, the "paroxysmal dysrhythmia" of Lennox and Gibbs, and (3) severe epilepsy, characterized by total or almost total disintegration of the electroencephalogram. Electroencephalographic records were made also for 9 patients with cerebral tumor, for 6 of whom the diagnosis was verified either at operation or at necropsy. Localization was accurate not only for these 6 but probably for the other 3. For 9 patients with craniocerebral trauma the electroencephalogram indicated the location as well as the extent of the lesion. In a patient with occipital hematoma, localization according to Jasper's orientation was accurate. A syphiloma of the temporal lobe and an abscess of the right frontal lobe produced a well defined zone of delta waves. Tests of the remaining patients with organic cerebral diseases all gave electroencephalographic data concordant with the clinical aspects.

Revista Médica Peruana, Lima

13:465-508 (Aug.) 1941. Partial Index

*Blood Transfusion in Therapy of Bronchopneumonia in Infants Living in Cities at 3,420 Meters Above Sea Level. J. Arce Larreta.—p. 480.

Blood Transfusion in Bronchopneumonia of Infants.—Arce Larreta treated infants aged 9 to 11 months with bronchopneumonia with transfusions of citrated blood. Transfusions were given into the superior longitudinal sinus daily in amounts of 60 cc. for the first two days and every other day in amounts which varied from 60 to 120 cc. of blood. As many as four additional transfusions were given. The patients were likewise given sulfanilamide, cardiac tonics and oxygen. If the symptoms of intoxication are grave it is advisable to withdraw from the superior longitudinal sinus an amount of blood corresponding to that to be transfused. In all the author's cases a favorable effect was apparent immediately after the first transfusion. It is advisable, however, to continue transfusions until a cure is obtained.

Semana Médica Española, Madrid

4:255-274 (Sept. 20) 1941

Problem of Strabismus. B. Carreras.—p. 255.

Paralytic Talipes: Pathogenesis and Treatment. D. Fernandez Iruegas.—p. 261.

*Adrenal Insufficiency Without Melanoderma. E. Arias Vallejo.—p. 269.

Late Results of Nephrectomy for Renal Tuberculosis: Observations on a Patient Twenty-One Years After Intervention. A. and E. de la Peña.—p. 273.

Adrenal Insufficiency Without Melanoderma.—Arias Vallejo points out that until recently the diagnosis of adrenal insufficiency was based on the characteristic bronzed pigmentation of the skin. Often the sight of thin, asthenic persons with hypotension raised the suspicion of a hypofunction of the adrenals, but when the characteristic melanoderma was not encountered the diagnosis was rejected. Now, thanks to the work of Sergent and the clinical observation of Marañón, it is possible to affirm the existence of adrenal insufficiency in the absence of melanoderma. Such conditions constitute the non-addisonian or atypical form of addisonism or of hypoadrenalism. Marañón differentiates two groups of nonaddisonian forms of adrenal insufficiency. The first group includes cases of Addison's disease in the phase that precedes pigmentation, and a second group in which pigmentation will never develop. He had observed many cases of adrenal insufficiency without pigmentation; in few, however, did the disease reach the final stage without the occurrence of melanoderma. The author reports the case of a man aged 47 with a family history of pulmonary tuberculosis. His disorder began with persistent anorexia, severe asthenia and emaciation. The blood pressure was low. Hypoglycemia and postinsulinic acidosis were characteristic and led to the diagnosis of adrenal insufficiency, although the patient presented no cutaneous or mucosal pigmentation or the solar pigmentation which is so pronounced in persons with hypo-

adrenalism. Not being able to obtain either adrenal cortex extract or vitamin C (because of the Spanish war), the patient was put on a diet high in sodium chloride, low in potassium and rich in carbohydrates and fats. On complete rest, administration of epinephrine by mouth and injections of sodium cacodylate, there was some improvement. A pronounced improvement occurred after some adrenal cortex extract had been obtained and administered, but shortly after the patient died. Even at death there was no pigmentation. According to the author adrenal insufficiency is much more frequent in the swarthy complexioned than in the light complexioned (17 to 1 in his own limited material). The disease is frequent in countries in which dark-skinned persons predominate. Clinical signs which permit the diagnosis of adrenal insufficiency in the absence of pigmentation are asthenia, hypotension, persistent anorexia, sexual disturbances (impotence, frigidity, sterility) and loss of weight. The most important functional tests are those which demonstrate hypoglycemia and postinsulinic acidosis. Disturbances in the muscular metabolism are indicated by creatine in the urine, by the decrease in creatinine and by changes in the lactic acid. Disturbances in the sodium-potassium equilibrium are characteristic. The treatment of adrenal insufficiency without melanoderma is the same as that of typical Addison's disease.

Deutsche medizinische Wochenschrift, Leipzig

67:807-830 (July 25) 1941. Partial Index

Neurologic Points of View in Estimation and Treatment of Injuries of Peripheral Nerves. P. Vogel.—p. 807.

Increased Frequency of Gastric and Duodenal Ulcers During War? H. Rothe.—p. 810.

*Prognosis of Intermittent Claudication. H. von Hasselbach.—p. 814.

Tolerance for Massive Dose of Vitamin D₂. W. Uhse.—p. 819.

*Dolantin in Recurrent Hiccup. H. Jessen.—p. 821.

Prognosis of Intermittent Claudication.—According to von Hasselbach intermittent claudication is not a disease sui generis but rather a symptom that may result from various vascular diseases, and its prognosis therefore varies with that of the disorder which produces it. Intermittent claudication occurs particularly in arteriosclerosis, whether this is accompanied by diabetes or not, and in the course of endangitis obliterans. It is an especially frequent symptom of the latter, the author having observed it in 75 per cent of 230 cases. Its appearance may be regarded as the preliminary stage of threatening gangrene. Intermittent claudication is likewise frequent in arteriosclerosis of the extremities. It is usually unilateral at first. During the attack the involved member is pale or cyanotic and cold. Muscular atrophy becomes evident soon after the first manifestation. When intermittent claudication is due to arteriosclerosis the former is so far advanced that hypertension, rigidity of the vessels and signs of general wear are usually evident. The diabetic patient with intermittent claudication has no prospect of being freed from his trouble, because of the existing severe organic vascular changes. There is a tendency to rapid exacerbation. Treatment rarely prevents the development of gangrene for more than several months. The severity of the diabetes is, however, no measure of the extent and course of the vascular involvement. In patients with a slight increase in blood sugar intermittent claudication and rapidly progressing gangrene which cannot be arrested even if the blood sugar is normalized may develop; on the other hand, the improvement in the sugar content of the blood is necessary for the improvement of the vascular disorder. The prognosis of intermittent claudication is somewhat more favorable for the arteriosclerotic patient without diabetes. If the irreparable vascular changes are not too extensive suitable treatment will relieve the trouble for a long time. If local necrosis has developed in a patient with arteriosclerosis the prognosis is unfavorable with regard to the preservation of the member. In endangitis obliterans intermittent claudication can be favorably influenced for months or even years and the patient may remain free from complaints. However, the evolution of endangitis obliterans is unpredictable, and intermittent claudication may soon be followed by gangrene. There is no record of a complete cure of endangitis obliterans, but remissions lasting up to eight years have been known to occur. The ultimate prognosis is unfavorable.

Treatment of Recurrent Hiccup.—Jessen cites several cases from the literature and describes a case of his own in which relapsing hiccup that proved refractory to various mea-

tures was promptly counteracted by the subcutaneous or intravenous injection of the hydrochloride of the ethyl ester of 1-methyl-4-phenyl-piperidine-4-carboxylic acid, also known as dolantin or dolantal.

Deutsches Archiv für klinische Medizin, Berlin

187:353-464 (May) 1941. Partial Index

- *Significance of Hypoproteinemia in Nontropical Sprue. H. Oettel and S. Thaddea.—p. 353.
Treatment of Flatulence. B. Kemkes.—p. 410.
Atypical Electrocardiographic Pictures of Intraventricular Conduction Disturbance. A. Moll.—p. 415.
Congenital Syphilis in Third Generation: Symptomatology and Clinical Significance: Report of Three Cases. M. Werner.—p. 435.
Nature of Periodic or Cheyne-Stokes Respiration and Its Modification by Oxygen Administration. M. Gukelberger.—p. 443.

Significance of Hypoproteinemia in Nontropical Sprue.

Oettel and Thaddea investigated the problem of protein balance in nontropical sprue. They maintain that reduction of the plasma protein with edema may exist years before the appearance of intestinal disorders; for this reason it is doubtful whether the primary disturbance of sprue is always to be found in the intestine. In only 1 patient did the protein deficiency of the plasma run parallel to the gastrointestinal symptoms. In 2 others protein deficiency of the plasma existed years before sprue symptoms appeared. The combination of adrenal cortex extract and liver preparations is particularly effective in the treatment. Extracts of the anterior pituitary are ineffective. Since results could be obtained with transfusions and with adrenal cortex preparations it can be assumed that the protein formation in the liver and bone marrow is impaired. Disturbances in protein formation as well as in absorption play a part in the pathogenesis of nontropical sprue. The disturbance in the plasma protein formation may be the clinicochemically detectable onset: the vicious circle which follows results in secondary disturbances in the intestinal absorption. The functional impairment of the adrenal cortex, which is likewise secondary, explains such clinical signs as absorption disturbances in pigments, plasma proteins and fats. Nontropical sprue predisposes to hypovitaminosis A. Metabolism, salt and mineral metabolism become secondarily impaired. Relation to incretory glands can be explained by the close relationship between hormones and vitamins. There is so far no proof for the causative role of the hypophysis and the adrenal glands in nontropical sprue. The theory that the disturbance in intestinal absorption is caused by hypoproteinemia and that it develops parallel with other manifestations of failing function (edema, hypocalcemia, nephrosis) is supported by the authors' observations.

Zeitschrift für Orthopädie, Stuttgart

71:289-401 (Jan. 31) 1941. Partial Index

- *Traumatic Etiology of Torticollis. J. Janěk.—p. 290.
Three Points of Fundamental Importance in Correct Estimation of Skeletal Changes in Congenital Dislocation of Hip Joint. S. Nagura.—p. 295.
Aspects of Antetorsion of Upper End of Femur. S. Nagura and S. Kosuge.—p. 303.
Easy and Rational Method for Reduction of Congenital Dislocation of Hip Joint. E. Kopits.—p. 312.
*Results of Helferich's Arch Shaped Resection in Tuberculous Gonitis of Adults. L. Horeysek.—p. 317.

Traumatic Origin of Torticollis.—Janěk describes a case of torticollis of traumatic origin in an infant. An operation was performed when the child was 3 months old. The microscopic examination of the removed tissue corroborated the assumption that the lesion had resulted from a birth injury. The clinical course likewise suggested a traumatic origin. The author does not assert that in all cases torticollis is of traumatic origin, but he opposes the assertion that there is no traumatic form of torticollis. The relation between the postnatal development of the tumor of the sternocleidomastoid muscle and the torticollis has not been clearly explained so far. In some cases a large tumor of this muscle is absorbed without subsequent shortening; in other cases even a small, spindle shaped tumor results in considerable shortening and severe torticollis.

Arch Shaped Resection in Tuberculous Gonitis.—Helferich's arch shaped resection was practiced on 25 patients at the orthopedic clinic in Dortmund, according to Horeysek. The author made follow-up examinations of 22, while from the other 3 information was obtained by letter. The operation resulted

in a cure of the gonitis in all cases. The author considers the Helferich arch shaped resection as the method of choice in treatment of tuberculous gonitis of adults. With the exception of hydrops tuberculosus all forms of tuberculous gonitis in adults are indications for the arch shaped resection. Prolonged conservative treatment is of no avail in adults. In König's classification 17 of the 25 patients presented suppurating tuberculous gonitis with destruction of cartilage, ligaments and menisci and with foci of infection in bone and abscesses of the soft parts. The other 8 patients had a granulating form of tuberculosis without visible foci in bone but with dense, indurated synovial tissue and with secondary involvement of the cartilage and of the interarticular fibrocartilages.

Zentralblatt für Chirurgie, Leipzig

68:1137-1184 (June 21) 1941. Partial Index

- *Technic of "Intramedullary Nailing" in Fractures of Lower Leg and of Humerus. G. Küntscher.—p. 1138.
Pseudobursitis Calcarea on Shoulder Joint. H. Debrunner.—p. 1154.
Significance of Cartilage Callus Formation in Etiology and Pathogenesis of So-Called Aseptic Epiphysal Necrosis. S. Nagura.—p. 1156.
*Bone Transplantation in Treatment of Strumiprивous Tetany. I. Turai and R. Robacki.—p. 1159.

"Intramedullary Nailing" in Fractures.—Küntscher describes the technic of intramedullary nailing of fractures of the lower leg and the humerus. This method has been used in more than 100 cases and has proved superior to all other methods. The fragments of bone are so tightly joined by a flanged steel nail introduced into the medullary cavity that other devices, such as plaster or extension bandages, are superfluous. The mobility of the member is not impaired. The nail is V shaped in transverse section and can adapt itself to the varying width of the medullary cavity. The nail should be sufficiently long so that it may extend into each fragment for at least 5 cm. The thickness of the nail must be adapted to the diameter of the medullary cavity. The nail is introduced without exposing the site of the fracture; so there is no danger of an infection in a fresh fracture. Besides a small wound dressing, no bandage is needed. The method is of great value also in osteotomy of old fractures and in pseudarthroses.

Bone Transplantation in Strumiprивous Tetany.—Turai and Robacki discuss various treatments that have been employed in strumiprивous tetany: administration of calcium and dihydro-tachysterol, injections of solution of parathyroid, measures that counteract alkalosis, giving vitamin C, ultraviolet irradiation, transplantation of parathyroids, reactivation of the parathyroids by cervical sympathectomy and sinocarotid neurotomy, and particularly transplantation of bone. Milcu's description of a biologic method of assaying the inadequacy of the parathyroids induced the authors to investigate the mode of action of transplantation of bone in strumiprивous tetany. Milcu's biologic assay consists in the visualization of parathyrostimulin (which is produced by the hypophysis) on the parathyroids of rats. Normally, parathyrostimulin does not appear in the urine, but when the parathyroids are inactive it does, and its quantity increases in proportion to the degree of parathyroid insufficiency. The appearance of clear vacuolated cells in the parathyroids of rats signifies a positive reaction. The authors report 2 cases in which they resorted to transplantation of bone into the sheath of the abdominal rectus muscles. Their object was not to demonstrate the therapeutic efficacy of this method but rather to show that the transplanted piece of bone stimulates the activity of the phosphatases. The transplanted bone is a complex of phosphorus and calcium combined with a protein molecule. The organism reacts to it as to a foreign body, it produces specific ferments, phosphatases, which dissolve the phosphorus-calcium complex. The action of the phosphatases is not limited to the site of transplantation; the phosphatase content of the serum increases to twice or three times the normal amount. Thus the transplanted bone acts as a stimulus for the cleavage diastases of the circulating calcium complexes but not as a calcium depot. It had been demonstrated by Leriche and Jong that the daily absorption of calcium from the implanted bone is so small (1 to 4 mg.) that it cannot explain the improvement.

Mitt. a. d. med. Akad. zu Kioto, Kyoto

32:867-1238 (July) 1941. Partial Index

*Experimental Study on the Transfusion of Preserved Blood. Y. Nakamura.—p. 867.

*Sugar Content of Preserved Blood. C. Kato and N. Nakahori.—p. 1112.

Transfusion of Preserved Blood.—Nakamura made a series of observations on the properties and effect of citrated rabbit's blood at varying periods of preservation and storage on immunologic reactions following transfusion. He found that the agglutination and bacteriolytic titers, as well as the protective attributes of preserved normal (nonimmune) blood remained unchanged during the first twenty-one days but that thereafter it gradually deteriorated. The opsonic index of the serum is lowered rather rapidly, but the anti O and anti H agglutination titers, the bacteriolytic titers and the protective power of immune blood remain constant during the first twenty-one days of preservation. The opsonic index of the serum diminishes rather slowly. Transfusion of preserved normal blood has a beneficial effect on the production of agglutinins, opsonins and bacteriolysins, there being no effects different from those produced by transfusion of fresh blood. The immune titers and the amounts of transfused blood bear a direct relation to the disappearance time of added immune bodies in the recipient's blood, while the length of preservation is inversely proportional to these reactions. Furthermore, the changes in the anti O agglutinin, opsonin and bacteriolysin resulting from transfusion of immune blood and serum parallel one another; the anti H agglutinin alone tends to disappear much more rapidly than others. The fluctuations in the immunologic reactions produced in the recipient's blood by the transfusion of preserved blood are not appreciably different from those following transfusion of fresh immune blood. The immune bodies in the recipient's blood, as produced by transfusion of preserved immune blood, appear to be more lasting than the immune bodies set up by transfusions of fresh and preserved homologous serum, as well as those resulting from preserved heterologous serum. The effect of transfusion of homologous immune serum is more permanent than that of transfusion of heterologous immune serum.

Sugar Content of Preserved Blood.—Using the picramic method of Seifert, Kato and Nakahori made a series of quantitative determinations on the sugar content of preserved human and rabbit blood which had been kept at 3 to 4 C. (37 to 39 F.). The reducing power of rabbit's blood begins to decrease after forty-eight hours of storage, but some of the samples exhibited no evidence of diminution for as long as two hundred and sixty-four hours. On the other hand, human preserved blood appeared to contain greater glycolytic activity, since in most of the samples the sugar content was found to be less than 30 mg. per hundred cubic centimeters when tested after forty-eight hours of storage. The glycolytic action of preserved blood is due to the ferment present in the formed elements of the blood, and therefore this action is either greatly retarded or entirely abolished when the erythrocytes are hemolyzed by freezing and they are, as sediments, removed from the sample.

Sei-I-Kai Medical Journal, Tokyo

60:582-762 (June) 1941. Partial Index

*Studies on Anaphylactic Reaction Caused by Various Milks and Their Protein Fractions. K. Miyata.—p. 684.

Anaphylactic Reactions Due to Milk Proteins.—Miyata reports a series of experiments on the anaphylactic phenomena produced by milk, with special reference to the anaphylactogenic and desensitizing abilities of various types of milk, such as that of the cow, the goat, the rabbit and man, as well as to their protein fractions, particularly casein, albumin and globulin. Guinea pigs sensitized by intraperitoneal injections of the raw milk of man, the cow, the goat or the rabbit exhibited typical anaphylactic reactions in response to the application of each antigen. The results of desensitization experiments in these animals showed that cow and goat milk are closely related, as evidenced by their similar actions; but the milk of the rabbit and of man gave no evidence of any such relationship. Rabbits

were sensitized by three intravenous injections of 2 to 3 cc. of whole milk or albumin solution, and the degree of hypersensitization in these animals was tested by reinjection of those antigens which produced changes in blood pressure. As tested by this method, rabbits sensitized to cow's milk were capable of being desensitized by the injection of goat's milk; conversely, sensitization produced by goat's milk could be neutralized by the injection of cow's milk. Here again was demonstrated the mutual relationship between cow's and goat's milk in this particular respect. Desensitization was also detectable in animals sensitized to whole milk when they were tested by the injection of casein and globulin fractions, whereas an albumin solution was found to be ineffective. The precipitin titers of rabbit blood, estimated before and after the observations of blood pressure changes, showed proportionately parallel fluctuations corresponding to the rise or the fall of blood pressure due to the reinjection of the antigens. Absorption tests of precipitins, conducted with immune rabbit serum produced by the same sensitizing agents, further demonstrated the proportionate parallelism between the absorbability of the precipitins and the degree of desensitization.

Geneeskundig Tijdschr. v. Nederl.-Indië, Batavia

81:2053-2120 (Sept. 30) 1941. Partial Index

Systematic Campaign Against Trachoma in the Desa (Native Village). R. Kodijat.—p. 2057.

Systematic Campaign Against Trachoma in the Compound. M. Gardjito.—p. 2062.

Some Suggestions in Connection with Combat of Trachoma. S. Hadibroto.—p. 2072.

Scleritis. S. Hadibroto.—p. 2077.

Atropine Poisoning Following Drops in the Eyes in a Child of 8 Months. Que Keng Lead.—p. 2080.

Corneal Fistula. A. W. M. Houwer.—p. 2084.

Transplantation of Conjunctiva (Clinical and Histologic Peculiarities of Cadaver Conjunctiva). Sie Boen Lian.—p. 2097.

81:2121-2176 (Oct. 7) 1941. Partial Index

New Salmonella Types in Human Subjects. M. Erber.—p. 2123.

*Therapy of Gastric Hemorrhage. A. van Meeteren.—p. 2147.

Renal Carbuncle and Paraneuritis. J. R. von Ronnen.—p. 2155.

Therapy of Gastric Hemorrhage.—Van Meeteren calls attention to Meulengracht's method, which provides generous amounts of food (as much as the patient desires) from the first day of the treatment. Meulengracht's method, although revolutionary, is not entirely new, Lenhart having advanced a similar one in 1903. The only concession which Meulengracht makes to the hemorrhage is that he gives all foods in puréed form. There are practically no dietetic restrictions, except that foods which can be puréed are given the preference. In addition to the puréed diet the patients are given three times daily a teaspoon of a prescription containing 15 Gm. each of sodium bicarbonate and magnesium subcarbonate, also 2 Gm. of hyoscyamus extract. Patients who have lost much blood are given a blood transfusion. Van Meeteren employed Meulengracht's method in 30 cases. The only medicament he gave in addition was vitamin A (22,000 international units three times daily). On the basis of his observation he recommends Meulengracht's diet. The method excludes the indication for "early operation" in gastric hemorrhage.

Ugeskrift for Læger, Copenhagen

103:1301-1330 (Oct. 9) 1941

Review of Progress in Internal Medicine Since 1896. K. Faber.—p. 1301.

First Aid in Fractures of Jaw. J. Fabricius-Møller and H. Kjaerholm.—p. 1307.

*Therapy in Subacute Bacterial Endocarditis, Especially Significance of Immunotransfusion. R. Friedberg.—p. 1312.

Therapy in Subacute Bacterial Endocarditis.—Friedberg describes a case of subacute bacterial endocarditis in which treatment with sulfanilamide and its derivatives, continued heparin infusions and numerous transfusions of immune blood were without effect. He believes that in the immunization of donors for immunotransfusions considerably larger doses of vaccine should be given than are generally used and that before transfusion heparin should be added to the immune blood.

Book Notices

Physical Medicine: The Employment of Physical Agents for Diagnosis and Therapy. By Frank H. Krusen, M.D., F.A.C.P., Associate Professor of Physical Medicine, the Mayo Foundation, University of Minnesota, Rochester. Cloth. Price, \$10. Pp. 846, with 351 illustrations. Philadelphia & London: W. B. Saunders Company, 1941.

Somewhat belatedly comes this review of a book which has already established fully its place in medical practice. In a single volume here are outlined the main branches of physical medicine including the use of heat, light, electricity, water, massage and similar methods, with special chapters on the direct application of these methods to the control of disease, the methods of teaching physical medicine and the use of physical methods in the hospital. The work begins with a fascinating history of the introduction of physical methods which, of course, were among the very earliest used by primitive men. It is a far cry indeed to the present basing of physical methods on actual knowledge of anatomy, physiology and physics, from the empirical use of methods in the natural hot springs of the pre-Christian era. The very large section on heat discusses all the different methods by which heat is employed and will be a revelation particularly to the physician who thinks only of the possibility of heat from a hot water bottle or a diathermy apparatus. The combination, for instance, of heat from a fever cabinet and a chemotherapeutic technic brings about remarkable results in many instances. Most of the conclusions reported by Dr. Krusen are based on personal experience with the methods concerned. Light is given similar consideration, with an introduction indicating the various forms of light that are employed in medicine, the effects of such lights on the physiology of the human body, the indications for use, the contraindications and the results which may be anticipated. With the section on electricity one begins to understand how complicated physical therapy may actually be and how much is required in the way of basic education before such methods are suitably employed. The book proceeds to an excellent discussion of hydrotherapy, the use of massage and exercise and other technics. There is a magnificence of detail which makes every section of the book exceedingly practical. A special chapter on physical therapy in industrial medicine and in military medicine indicates the immediate usefulness of this text for many different purposes. The book has an excellent index.

Communicable Disease Control: A Volume for the Health Officer and Public Health Nurse. By Gaylord W. Anderson, A.B., M.D., Professor and Head of the Department of Preventive Medicine and Public Health, University of Minnesota, Minneapolis, and Margaret G. Arnstein, R.N., M.A., M.P.H., District Supervising Nurse, New York State Department of Health. Cloth. Price, \$4.25. Pp. 434. New York: Macmillan Company, 1941.

This volume, which is intended for the health officer and public health nurse, is divided into two parts. Part one discusses historical considerations, the infectious process, control measures, the legal basis of communicable disease control, administrative agencies, role of the public health nurse, care of a communicable disease case at home and epidemiologic investigation of communicable diseases. Part two describes specific measures for the control of typhoid and paratyphoid fever, the dysenteries, hookworm, food poisonings and infections, trichinosis, undulant fever, diphtheria, hemolytic streptococcus infections, whooping cough, measles, chickenpox, German measles, mumps, smallpox, anterior poliomyelitis, meningococcal meningitis, encephalitis, pneumonia, influenza, common colds, tuberculosis, gonorrhea and syphilis, rabies, tetanus, impetigo, pediculosis, scabies and ringworm, and diseases spread through arthropods.

According to the authors this volume has been written principally from the standpoint of the community, and emphasis has been placed on those procedures which are designed to protect the population as a group. However, personal protection has not been neglected. The reader will find a common sense approach to the problem of communicable disease control. Unfortunately, the chapter on historical considerations becomes so highly philosophical in places that interest wavers at the beginning. More facts and fewer generalities would probably receive greater approbation. The same criticism is applicable

to the chapter on the infectious process. Further, this second chapter reads as if it were intended for the untrained student; it is written with almost reproachable simplicity. Perhaps it is the attempt to attain simplicity that accounts for two contradictory statements such as "The pathogenic animal parasites, bacteria and viruses do not multiply outside the animal host" and "typhoid bacilli can survive for long periods of time outside the body if in reasonably moist environments that are not too acid; in some cases they can even multiply."

The chapter on control measures is an excellent approach to evaluating and employing the measures that may be used for the control of communicable diseases. The dissertations on the basis of communicable disease control, administrative agencies and role of the public health nurse offer equally interesting possibilities for a better understanding of health maintenance.

While avoiding unnecessary detailed statements, the authors offer sufficient details on the control of specific infections in part two to make this section worthwhile reading for those whom the book was intended for, namely the health officer and the public health nurse.

This book is not intended to supply information on therapeutics; its function is to discuss problems relating to prevention and control measures. Further, the problems of home care, rather than of hospital care, are stressed.

Doctors Mayo. Helen B. Clapesattle. Introduction by Guy Stanton Ford. Cloth. Price, \$3.75. Pp. 864, with 64 illustrations. Minneapolis: Univ. Minnesota Press, 1941.

Outstanding among medical biographies of 1941 was this life of two of American medicine's greatest leaders. By this time at least fifty thousand purchasers have indicated their interest in the book. The interest is well justified not only by the orderly combined scientific and historical approach to the subject but also by the quality of the presentation, the excellent illustrations and the detail of the content. This life of the Mayos traces the growth of the men themselves and of the institution to which they devoted their lives from the time when the first Mayo came to the United States in 1845 to the day when the President of the United States himself journeyed to Rochester, Minn., to confer on the Mayos the distinguished service plaque of the American Legion. Perhaps the time is not yet ripe for an analysis of the factors which combine to produce the Mayo Clinic and the Mayo Foundation. Nevertheless, it is not too soon to place on record the details of the lives of Drs. William and Charles Mayo, even if this book was to be only a source book of reference material. The book, however, is far more than that, for each step in the career of the Mayo brothers is considered with relation to the medicine of the times, to the medical attitudes, to public attitudes and similar factors. Almost amazing is the manner in which the author has traced surgical progress as a portion of the lives of the Mayos and made it understandable. Obviously, it is necessary to look into the complexities of medical organization, the effects of medical ethics, indeed the whole history of medicine throughout the world during the period from 1845 to the present. Perhaps the time is actually too soon to understand the extraordinary phenomenon of the Mayo Clinic, but much that is in this book will help to make that phenomenon understandable. The book is replete with anecdotes, with quotations from newspapers as well as from scientific periodicals and with comments by and about many of those who were associated with Drs. William and Charles Mayo in developing their work. Here indeed is a work well able to stand beside other important biographies like the Vallery-Radot "Life of Pasteur" and the Cushing "Life of Sir William Osler."

Die Goldbehandlung der chronischen Arthritis unter besonderer Berücksichtigung der Komplikationen. Von Fredrik Sundelin. Acta medica Scandinavica, Supplementum CXVII. Paper. Pp. 291, with 19 illustrations. Lund: Håkan Ohlssons Boktryckeri, 1941.

Use of gold salts in treatment of rheumatoid arthritis is slowly gaining some favor in the United States even among rheumatism specialists of broad experience, but with this increasing use of gold have come repeated reports of serious, and occasionally of fatal, toxic reactions. Whether results obtainable with this form of treatment justify the risks involved is not yet known with certainty. However, gold therapy will unquestionably be given extensive trial, and Sundelin's monograph, which reviews

the question of gold toxicity with considerable thoroughness, will be found increasingly useful to workers in this field. The volume is divided into two sections, the first devoted to a critical review of the literature on gold therapy and the second outlining the author's experiences with gold toxicity at the Nynas Kuranstalt, where gold was used in the treatment of 730 arthritic patients during the years 1934 to 1940. The first section probably represents the most extensive and most useful historical survey of gold therapy thus far published. It includes material on the origin of gold therapy, on pharmacology and on reported results of gold therapy, and a careful analysis of the literature relating to toxic reactions. The second section, which details observations at the author's clinic, would have been strengthened by distinguishing the types of arthritis under consideration, but the relevant material is presented without regard to this classification. Nevertheless the report contains important data. Details are presented of the toxic reactions as they affect various systems, and a fair statement of the present knowledge regarding therapy of these complications is presented. This monograph should be known to every rheumatologist who undertakes gold therapy for arthritis.

About Ourselves: A Survey of Human Nature from the Zoological Viewpoint. By James G. Needham. Cloth. Price, \$3. Pp. 276, with illustrations by William D. Sargent. Lancaster, Pa.: Jaques Cattell Press, 1941.

This is an effort to orient the reader in human nature from the zoologic point of view. The first part deals with man in his biologic aspects and the second with society in its biologic aspects. In part I there are chapters dealing with man's place in the living world, with the group of primates, with man's remote ancestry and the development of the nervous system, the brain, behavior, instinct and learning. This part of the book closes with chapters dealing with infancy and with nature and nurture in the human species. In developing these subjects the author cites examples to indicate the various levels of zoologic development and draws comparisons between them. In so doing he perhaps tends to assume that the average well educated though nonscientific reader has more basic knowledge of anatomy, physiology and biology than is actually the case. Nevertheless, with the exception of a few passages, the book should be quite intelligible at the college level.

In part II the author develops his conceptions of the biologic aspects of society with respect to quality and numbers of population, with social vs. the biologic inheritance, the components of social behavior, the role of instinct in human affairs, the chief products of the "folkways" and two chapters each relating to war and to government. He closes his chapter on government in the following words:

Government is our chief instrument of cooperation. It is the only one in which we all act together and which we all support. In other organizations, fraternal, educational, social, religious or what not, we go our several ways and are divided into competing groups. To our government we look first of all for defense and for a measure of public guidance. To it we yield obedience and independence of action. Under it we assume responsibility toward others. By means of government we make common cause of our common needs, with all the other citizens of our national group. The reason for this is force (the President of the United States is first of all Commander in Chief of the Army and Navy [Constitution of the United States, art. III, section II, paragraph I]). Government begins and ends in force.

The book closes with a chapter on religion, which is so general that it probably will satisfy few readers. Taken as a whole, it is a fine, scholarly presentation of the place of man in relation to nature as conceived in the terms of the evolutionary hypothesis.

Electrocardiography Including an Atlas of Electrocardiograms. By Louis N. Katz, A.B., M.D., Director of Cardiovascular Research, Michael Reese Hospital, Chicago. Fabrikoid. Price, \$10. Pp. 580, with 806 electrocardiograms. Philadelphia: Lea & Febiger, 1941.

In spite of the numerous new textbooks on electrocardiography which have appeared recently, another comprehensive and lucid presentation of this important adjunct to internal medicine is welcome. The author, one of the recognized leaders in the field of cardiology, submits a most complete and inclusive volume. The material has been divided into three parts. The first deals essentially with the theory, fundamental concepts and genesis of the electrocardiogram. The author has also utilized this section to present his own views on the origin

of electric currents in the heart and to point out certain inherent errors in applying the concept of the Einthoven triangle for the determination of the electrical axis. Section two includes a systematic presentation of the normal and abnormal variations of the components of the electrocardiogram. The electrocardiographic changes encountered in acute rheumatic fever and diphtheria and those following digitalis are adequately discussed. The major part, however, is devoted to the position of the electrocardiogram in coronary disease. The author has here attempted, and incidentally succeeded admirably, in presenting the various changes following coronary insufficiency on a physiologic basis. By so doing he has shown how the electrocardiogram is a pictorial representation not of anatomic changes in the heart but of fluctuation in the amount of blood being supplied the heart by way of the coronaries at specific time intervals. This entire concept is extremely important and its utilization in clinical practice makes for a clear understanding of the diagnosis, prognosis and therapeutics of coronary artery disease. The section closes with a complete discussion and presentation of the various electrocardiographic contours encountered in chronic diseases, such as congenital, chronic rheumatic, syphilitic heart disease, chronic cor pulmonale, hypertension and vitamin B deficiency states. One statement in this chapter with which the reviewer takes exception is noted on page 276; namely, that in hyperthyroidism "the large amplitude T waves . . . are relatively uncommon . . . more common . . . are small T waves." The final section is devoted to a complete and thorough description of electrocardiographic manifestations of the cardiac arrhythmias. Major attention is devoted to the more common varieties, but adequate description of the more uncommon types, such as parasystole, reentry, reciprocal and pseudo-reciprocal rhythm, are included. The text itself is well written, profusely illustrated and with extremely detailed legends.

The Advancing Front of Medicine. By George W. Gray. Cloth. Price, \$3. Pp. 425. New York & London: Whittlesey House, McGraw-Hill Book Company, Inc., 1941.

Here is as fine a collection of scientific essays, written especially for the public, as has been gathered together under one cover by any publisher in our modern times. The statement may seem strong, but it is warranted by the quality of Gray's contribution. He does not overdramatize. He has made certain of his scientific medical sources. He tells his story in a straightforward way. His book is informative for the public and will be equally informative to a great many physicians who wish to have in brief, easily readable form much of the recent advance in medical science. The subjects particularly concerned include the nature of disease, the new work on the blood and on blood pressure, sulfanilamide, influenza, allergy, the encephalograph, cancer and age. The book is supplemented by an excellent bibliography and index. It reflects adequately the manner in which modern medicine advances by encouraging all the fundamental discoveries in the basic sciences. As a contributor to *Harper's Magazine*, the *Atlantic Monthly* and the *Reader's Digest*, Mr. Gray has had recognition by leading literary publications. His book gives current news of scientific research as a scientist would wish to have such news given.

Exercises in Electrocardiographic Interpretation. By Louis N. Katz, A.B., M.D., Director of Cardiovascular Research, Michael Reese Hospital, Chicago. Fabrikoid. Price, \$5. Pp. 222, with 189 electrocardiograms. Philadelphia: Lea & Febiger, 1941.

This companion volume to "Electrocardiography" consists essentially of the presentation of 90 case reports. The author systematically and objectively first describes the electrocardiogram. He then interprets the curve. A brief clinical history follows, after which both clinical story and electrocardiogram are correlated. The cases are well chosen and represent the more common electrocardiograms to be encountered. If any fault is to be found, it lies in the format of the text. The reviewer feels that the value of the text would be somewhat enhanced had the cases presented been sectionally grouped as normal and abnormal, and the latter then further subdivided into infarction, preponderance, arrhythmias, and so on. This, however, in no way detracts from a book the careful perusal of which will more than repay the reader by furnishing a clearer concept of the relationship of electrocardiography to clinical medicine.

Queries and Minor Notes

THE ANSWERS WERE PUBLISHED HAVE BEEN PREPARED BY COMPETENT AUTHORITIES. THEY DO NOT, HOWEVER, REPRESENT THE OPINIONS OF ANY OFFICIAL BODIES UNLESS SPECIFICALLY STATED IN THE REPLY. ANONYMOUS COMMUNICATIONS AND QUERIES ON POSTAL CARDS WILL NOT BE NOTICED. EVERY LETTER MUST CONTAIN THE WRITER'S NAME AND ADDRESS, BUT THESE WILL BE OMITTED ON REQUEST.

THERAPY OF HOOKWORM INFECTION

To the Editor:—Will you kindly inform me as to the drug of choice in the treatment of hookworm disease, with recommended doses in both adults and children; what toxic effects might be anticipated from the use of these drugs?

E. W. Furgurson, M.D., Plymouth, N.C.

ANSWER.—The drug of choice in hookworm disease is hexylresorcinol, which can be obtained only in the form of caprokol pills, which are designed for stability of the drug and to prevent crushing in the mouth. The dose is 1 Gm. for an adult and correspondingly smaller doses for children. The pills must not be chewed, as hexylresorcinol is irritating to the mucous membranes of the mouth. The drug should be taken on an empty stomach in the morning and followed by a glass of water. Breakfast should be omitted and no food taken until lunch time. This allows reaction of the drug with the worms rather than with food.

Hexylresorcinol in a single dose will remove 80 to 100 per cent of the parasites without danger and may be repeated in two days. If ascarids should be present, the drug will remove practically all of these parasites without complications.

Tetrachlorethylene is even more effective. It may cause some dizziness and rarely if ever any toxic symptoms. If ascarids are present it should be avoided, as it may cause migrations of these parasites and severe complications. Treatment should be carried out in the morning, and breakfast must be omitted. The usual adult dose of tetrachlorethylene is 3 cc. Children may be given 0.2 cc. for each year of age up to 15 years. The drug should be given in a single dose in either of the following ways:

1. A purgative of magnesium sulfate should be dissolved in half a glass of water and the liquid tetrachlorethylene added to this and the whole shaken up and swallowed at one time. Any of the drug adhering to the glass should be rinsed off with additional water and taken.

2. Tetrachlorethylene may be given in hard gelatin capsules followed at once by the magnesium sulfate purge. The patient should rest and wait until the purge acts before eating. In some cases a second purge may be necessary to produce a bowel movement.

DISTURBED MEMORY AFTER PHENYTOIN

To the Editor:—A woman aged 21, who has had a history of epilepsy, has been on phenytoin sodium for about seven months. During the past month she has been feeling that something has begun to disturb her memory. She confuses people and things and can't remember easy lessons. She is at the point where she wonders if she should stay in school. Have you any data on possible ulterior reactions from phenytoin sodium and if these symptoms are suggestive of it?

William B. Brown, M.D., Columbia, Mo.

ANSWER.—In an epileptic woman of 21 years it would not be reasonable to attribute mental confusion or loss of memory entirely to the medication used in treatment. However, in this case there is a strong suspicion that phenytoin sodium is responsible. Merritt and Putnam in their original report on 200 patients treated from three weeks to eleven months stated that "... toxic reactions, tremors, ataxia, dizziness and the like [occurred] in approximately 15 per cent" (THE JOURNAL, Sept. 17, 1938, p. 1068). Kimball reported "dizziness and a staggering gait" (*ibid.* April 1, 1939, p. 1244). The Council on Pharmacy and Chemistry reported that "Various side actions of different degrees of severity which have been observed include dizziness, dry skin, dermatitis, rash, itching, tremors, fever, nausea, vomiting, blurred vision, fatigue, apathy, difficult breathing and swallowing, nervousness, mental confusion and active hallucinations . . ." (*ibid.* Nov. 4, 1939, p. 1734). Blair and his co-workers found that detrimental effects may occur with the use of the drug and warned that, when a patient's mental condition appeared worse, chronic poisoning should be suspected (*Lancet* 2:363 [Aug. 12] 1939). Weaver and his co-workers reported that 6 patients were extremely drowsy for from two to six weeks after medication, 3 patients had profound psychic distress and 3 had severe and persistent headaches (*Virginia M. Month.* 66:522 [Sept.] 1939). Williams reported that toxic symptoms developed in 36 per cent of the patients treated with this drug, and 2 died in status epilepticus (*Lancet* 2:678

[Sept. 23] 1939). Davidson and Sutherland treated 12 patients suffering from epilepsy with mental symptoms (psychotic behavior). They reported that the most prominent result was the appearance of toxic effects. These included headache, nausea, giddiness, loss of appetite and ataxia. Only 1 patient showed mental improvement. The authors advised that the drug should not be used more than a few weeks at a time (*Brit. M. J.* 2:720 [Oct. 7] 1939). Black feels that diphenyl hydantoinate should be used only for patients who do not respond to treatments which are less toxic (*Psychiat. Quart.* 13:711 [Oct.] 1939).

Obviously, phenytoin sodium (dilantin sodium) is not as effective or as harmless a drug as the circulars so frequently insist. In children and in petit mal epilepsy the drug is of little value. Certainly it does not replace the well established and relatively harmless phenobarbital as the first and least expensive treatment of choice.

ASTHENIA AND ACHING WITH GAIN IN WEIGHT

To the Editor:—A married woman aged 62, for many years a practical nurse, has (1) weakness, (2) aching and "burning" in all extremities, (3) anorexia and (4) a gain in weight of 20 pounds (9 Kg.). Thirty years ago she underwent a pelvic operation (removal of a uterine tumor, oophorectomy?) after which menstruation stopped; no symptoms of surgical menopause are remembered. She had had two normal pregnancies previously. Her health had always been good until one and one-half years ago, at which time she had influenzal symptoms (onset with severe sweating, fever for five days, aching in the extremities, weakness and loss of a usually good appetite). Her present symptoms all date from that time. The aching in the shoulders and legs will wake her at night, especially after the patient has been tired. The asthenia may be present at any time, often being present when she arises. It is unrelieved by rest. She is restless and nervous. She states that she cannot relax and sleeps poorly. She has had a gain in weight from 120 pounds (54 Kg.) to 140 (63 Kg.), despite a low food intake (consisting of small servings of vegetables and fruit, rare meat, eggs and little carbohydrate). Her breasts have definitely become enlarged in the last year; formerly her breasts were not developed. Occasionally mild pyrexia is present (the temperature being 99 to 99.6 F.). Agglutination tests give negative results. There is no enlargement of the thyroid. The physical examination gives negative results except for slight pitting edema of the ankles. A small uterus is palpable; the adnexa are normal. The urine contained no albumin or sugar on three occasions; the specific gravity is between 1.014 and 1.017 on twelve hour concentration tests. The hemoglobin content is 80 per cent. The red blood corpuscles number 4,100,000 and the white blood corpuscles 7,800. The Wassermann reaction is negative. The basal metabolic rate is 0. The blood pressure is 130 systolic and 84 diastolic. Injections of the vitamin B complex are being given.

R. L. Gorrell, M.D., Clarion, Iowa.

ANSWER.—There is nothing tangible in the clinical picture. It seems unlikely that there can be any connection between the operation of thirty years ago and the present symptoms. Too long a time has elapsed. Any so-called wasting disease seems ruled out by the gain in weight on a low calory diet. The mild pyrexia seems relatively unimportant for the same reason. Has undulant fever been ruled out?

A glandular dysfunction seems the most reasonable explanation. A pituitary disturbance is suggested by the enlargement of the breasts and the gain in weight. It might be worth while to determine the sugar tolerance and map the visual fields. It seems doubtful that a roentgenogram would show anything abnormal.

The fact that the aching and the asthenia followed an acute infection suggests the presence of chronic fibrositis or myositis. This diagnosis does not fit in well with the gain in weight, but the possibility is worth considering.

Has the circulation in the extremities been investigated? An arteritis such as Buerger's disease would seem to fall within the range of possibilities.

An adrenal deficiency should also be considered. If it is impossible to establish the diagnosis it might be worth while to administer one of the adrenal cortex hormones in a therapeutic trial. All of this is grasping at straws and is most unsatisfactory medical practice.

PILOCARPINE AND PHYSOSTIGMINE FOR GLAUCOMA

To the Editor:—Would the continuous use of pilocarpine hydrochloride or physostigmine (eserine) sulfate for a period of ten years in the eye cause a cloudiness of vision or a conjunctivitis? Which do you consider the more harmless of the two for long use in a case of glaucoma? Is there any other medication that could be used to relieve the tension within the eye in a case of chronic glaucoma?

Sidney Scheinman, M.D., New York.

ANSWER.—Any drug instilled into the conjunctival sac over a long period of time is apt to produce conjunctivitis medicamentosa, which at its greatest severity may simulate trachoma. If allowed to persist, disturbances in the corneal epithelium may result with consequent decrease of vision. Furthermore, for some persons the use of a solution of pilocarpine or physostig-

mine that is too strong and that is used too frequently starts a marked irritation of the iris and anterior uvea with resultant posterior adhesions, lens opacities and vitreous deposits. Withdrawal of the offending drug, the use of a bland eyewash and the instillation of 1:1,000 epinephrine hydrochloride solution several times daily is sufficient to relieve conjunctivitis medicamentosa.

For long continued use in a case of chronic glaucoma, pilocarpine is far preferable to physostigmine. When chronic glaucoma requires physostigmine to control the tension, that case passes from the medical to the surgical category, except when an idiosyncrasy toward pilocarpine is present. Then weak physostigmine solutions may be used. If both of these drugs produce conjunctival irritation, recourse may be had to 2 per cent Doryl in 1:3,000 solution. Favorable reports about this drug were made recently by O'Brien of Iowa City. It has not yet been submitted for consideration by the Council on Pharmacy and Chemistry.

Fully fifty years ago, Hirschberg showed that the irritating effects of pilocarpine solutions were due either to a transformation into jaborandi or to a bacterial contamination of the solution. The former is of rare occurrence, but the majority of patients contaminate their pilocarpine solutions from the tip of the dropper. When the solution is to be used over a long period of time, it is well to instruct the patient to strain it through fine linen every two weeks and to sterilize the opened bottle in a double boiler.

VICARIOUS HEMORRHAGE?

To the Editor:—Is there such a thing as vicarious hemorrhage? I do not refer to a nasal hemorrhage, one that is an effort of nature to relieve a natural but suppressed function, such as menstruation. The hemorrhage I refer to may occur as a result of cessation of prolonged bleeding in one part of the body recurring, after months, in another part.

H. S. Jones, M.D., Kansas City, Mo.

ANSWER.—Vicarious hemorrhage in the sense implied in the question does not exist or is extremely rare. The term should be applied only to hemorrhage from mucous membranes (due to diapedesis of red cells) that occurs in the suppression of normal menstruation.

When cessation of prolonged bleeding in one site is followed by a recurrence in another site there is practically always an underlying constitutional cause for the bleeding, such as thrombocytopenic purpura, Schönlein-Henoch disease, hemophilia, familial telangiectasis or another blood dyscrasia; or there may be a local cause for the bleeding, such as increased capillary or venous pressure, as occurs in hemorrhage from esophageal and hemorrhoidal varices in portal hypertension, nasal hemorrhage in systemic hypertension or pulmonary hemorrhage in rheumatic heart disease. In the former constitutional diseases hemorrhage may occur from only one part of the body for months or years, to be replaced by hemorrhage in another part. Periods of remission are also common, with complete cessation of bleeding for many months, followed by recurrence in the same or in another site. It is extremely unlikely that suppression of hemorrhage from one site will by itself result in hemorrhage from another site. This applies particularly to the example presented, in which a period of months elapsed before the hemorrhage recurred. It is highly probable that the recurrence of a hemorrhage in another part of the body would result from the same blood dyscrasia or abnormality in capillary walls which caused the original hemorrhage and would be in no way related to the cessation of bleeding in the original site.

In hemorrhage due to increased intravascular pressure, the site of bleeding depends on the point least resistance to the increased tension. Removal of one source of bleeding does not predispose to or precipitate bleeding at another site.

OILY SOLUTIONS FOR INTRATRACHEAL INJECTIONS

To the Editor:—With reference to injection of iodized oil into the lungs, for many years in bronchial conditions I have been using tracheal injections of about 1 to 2 cc. of mono-p-chlorophenol solution (Pilling) and also camphor menthol in liquid petrolatum. Are these injections contraindicated according to later findings?

Joseph Halton, M.D., Sarasota, Fla.

ANSWER.—According to recent investigations, the use of liquid petrolatum as a vehicle for intratracheal injections of camphor or menthol is contraindicated. Liquid petrolatum, when used over a moderate period of time, may produce a chronic form of lipid pneumonia which progresses to an abundant fibrosis or even to the formation of pulmonary oil tumors (paraffinomas). Mono-p-chlorophenol, a phenol derivative, is likewise usually used with liquid petrolatum as a vehicle, and consequently the same objection holds. However, it has recently been placed on the market with a vegetable oil (sesame oil) in place of the

liquid petrolatum to overcome this objection. Vegetable oils, chemically saturated, apparently have little effect on the bronchial mucosa or the alveolar system. Lipiodol (poppyseed oil saturated with iodine) is such an oil and is relatively nonirritating in this respect.

PROBLEM OF SYPHILIS AND GONORRHEA IN MAID

To the Editor:—A patient has a Negro maid aged 19 who on examination for a vague abdominal complaint gave a 4 plus Wassermann reaction as well as a profuse vaginal discharge which on smear showed many gram-positive and gram-negative cocci and bacilli and many pus cells but no intracellular cocci. The girl is single and admits sexual contact but denies that she has had a chancre or any apparent secondary manifestation. The rest of the examination gives negative results regarding congenital stigmas, mucous patches and the like. Antisyphilitic treatment has been begun, but how should the mistress be advised? The family has two children, a girl aged 2 and a boy aged 10. Should the maid be allowed to work in the house? There is no separate maid's bathroom. If so, what precautions should be taken and how should the discharge be treated—with sulfathiazole or what? M.D., New York.

ANSWER.—The question of immediate importance as far as the employment of the patient described is concerned lies in the tentative diagnosis of gonorrhea. On the basis of the information supplied, this diagnosis cannot be made with certainty. The bacteriologic diagnosis of gonorrhea in women cannot be satisfactorily made by means of smears but demands instead the use of culture. Culture should always be performed if the data on the smear are not corroborated by the history and by physical examination. The diagnosis of gonorrhea in women should be based on the following points: (1) a history of the symptoms of dysuria, vaginal discharge, vulvar pruritus, pelvic inflammation or acute arthritis and of exposure to a person known to have gonorrhea; (2) clinical examination, especially abdominal, pelvic and rectal; (3) Gram staining of secretions from the urethra, the glands of Bartholin, the cervix and the rectum, with the precautionary observation that the normal genital flora may contain organisms which closely resemble gonococci, and (4) culture, which should always be performed if the data on the smear are not corroborated by history and physical examination.

If the diagnosis of gonorrhea is certain, the patient should, of course, be temporarily laid off from work which involves such intimate contact with children until she has been adequately treated. Likewise, if the diagnosis of gonorrhea is still uncertain at the time this inquiry is answered it would be desirable to separate her temporarily from her work until the absence of gonorrhea has been demonstrated by culture.

As to treatment of gonorrheal infection, in the acute stages local treatment is unnecessary except for the maintenance of external cleanliness, and douches should not be used. If the patient has acute pelvic inflammatory disease she should be put at bed rest with ice bags applied to the abdomen, the bowels should be kept open by saline catharsis, enemas being avoided, and hot cleansing douches may be used.

For chemotherapy, sulfathiazole is the drug of choice. On the first day a total of 3 Gm. may be given, in six divided doses of 0.5 Gm. each, every three hours from 6 a. m. to 9 p. m. From the second to the ninth day inclusive the dose may be reduced to a daily total of 2 Gm., 0.5 Gm. being given every five hours from 6 a. m. to 9 p. m. On the tenth day if the patient is symptom free all treatment may be stopped.

The determination of cure of gonorrhea in women demands the use of cultures of material taken from the urethra and the cervix at monthly intervals, preferably on the last day of the menstrual period.

As to syphilis, although the patient shows no obvious lesions of this disease it may be safely assumed that because of her age she has been relatively recently infected, and she may therefore be regarded as potentially if not actually infectious. She should be treated as if the diagnosis of early syphilis were certain, the physician following the outline proposed by the Cooperative Clinical Group of continuous treatment over fifteen to eighteen months with alternating courses of a trivalent arsenical and of a bismuth compound. These drugs may be safely given concurrently with sulfathiazole without risk of increased reactions from either group of drugs.

Both as to syphilis and as to gonorrhea it would be desirable for the patient to be withdrawn from the intimate personal contact of her present occupation for at least two weeks after the initiation of treatment. However, the girl's employer should be told only that the patient has an infectious disease, and the names of the diseases gonorrhea and syphilis should not be used without the patient's consent.

At the end of two weeks' treatment with sulfathiazole for gonorrhea and with a trivalent arsenical for syphilis it may be safely assumed that the danger of household contact is practically past and the patient may be allowed to resume her occupation.

THREATENED AND INEVITABLE ABORTION

To the Editor:—In cases of abortion in which there is dilatation of the os, a history of bleeding and clinical and laboratory evidence of bleeding but no certainty that the fetus has been expelled, may curettage be done? Three times in the past two years patients have been brought to the operating room for the removal of retained secundines, and, contrary to the belief of all concerned, it was found that the fetus had not been expelled. If the conditions mentioned have been present and there has been careful observation of the patient for some time, would any one be at fault? Would a certain amount of dilatation of the os be considered sufficient evidence that expulsion of the fetus had taken place before admission to the hospital? If so, what would that amount of dilatation be? How can one be certain that the fetus is expelled or is no longer alive?

M.D., Washington, D. C.

ANSWER.—It is difficult and at times impossible to determine when an abortion ceases to be threatening and becomes inevitable or incomplete. In some instances pregnancy will continue in spite of a long period of moderate bleeding. As a rule, however, when bleeding begins in the first trimester of pregnancy and continues longer than a week in spite of the patient being kept at rest, one can assume that the abortion has become inevitable. The prolongation of conservative management may only postpone the inevitable end. In the majority of the patients who threaten to abort, serious damage incompatible with a continuation of the pregnancy has occurred prior to the onset of bleeding. Some dilatation of the cervical canal is present with the inevitable abortion, but cervical dilatation alone may not be sufficient evidence to establish the status of the abortion. Moderate or profuse bleeding and the passage of clots are as significant as dilatation of the cervix. The fact that the fetus is still in the uterine cavity in the presence of considerable bleeding and cervical dilatation is no proof that the pregnancy could have continued successfully. Oftentimes the fetus is dead or abnormal and the pathologic changes which initiate the abortion are in the chorion. The Aschheim-Zondek and Friedman reactions become negative six or eight days after fetal death. Pregnanolol determinations show a rapid decrease to a low level immediately after fetal death. Neither of these laboratory methods is often resorted to clinically.

POSSIBLE SPINAL CORD NEOPLASM

To the Editor:—A man aged 75, formerly an iron worker, began six years ago to have a steadily increasing pain in the left hand. About seven years ago he had intense itching of the left scapular region that required constant scratching to obtain relief. This gradually subsided and was followed by occasional feelings of numbness in the thumb, index finger and radial half of the middle finger of the left hand. Soon this numbness, inconstant at first, was accompanied by a general aching type of pain in the whole hand that appeared in attacks lasting several weeks, with intervals of several weeks of relief from pain. These attacks always occur shortly (one to two hours) after the patient goes to sleep, never when he is standing and awake, except when he sits in a low chair for any length of time. Relief is obtained by arising and by massaging and exercising his fingers. He then can lie down for a few more hours. Lately the pain has become more severe, accompanied by a feeling of stiffness and slight edema. Change in weather and strong exertion seem to make the night pain more severe. Recently the same condition, has appeared in the right hand, but when it does he is apparently less troubled with the left. He is a well preserved man; he is moderately stooped, weighs 188 pounds (85 Kg.) and has a blood pressure of 126 systolic and 80 diastolic. The Wassermann reaction is negative. The heart, lungs and abdomen show no abnormalities. Roentgen examination of the shoulder and the upper part of the spine show hypertrophic osteoarthritis with lipping and excrescence between the vertebrae; there is no evidence of a cervical rib. The blood vessels are soft and pliable, with no evidence of arteriosclerosis; radial pulses are equal and regular. There is definite anesthesia to a pinprick and to heat and cold in the involved fingers. Treatment has been difficult to evaluate because of the periods of remission of pain. Diathermy appears to be most beneficial, although most of the treatments suggested for acroparesthesia, hypertrophic osteoarthritis, neuritis, and the like, including roentgen therapy to the hand and the dorsal spine, have been tried with little if any relief. At one clinic the condition was diagnosed causalgia of the median nerve and possibly radiculitis and cervical spondylitis. Injection of procaine in oil into the nerve was of temporary benefit. An opinion of this case, with suggestions as to methods of treatment to give the patient relief, so that he may sleep at night, will be greatly appreciated.

David Soloway, M.D., Valley Stream, L. I., N. Y.

ANSWER.—This patient needs a careful manometric study of the spinal fluid to determine the presence or absence of a spinal block and the total protein content. The history is suggestive of a neoplasm of the spinal cord. Three other conditions suggest themselves: they are root pain secondary to spondylitis, osteoarthritis and syringomyelia. If a tumor is present neurosurgical exploration is indicated so that the tumor may be removed if possible. For the root pain of spondylitis, posterior section of the involved roots is indicated. Bilateral section of the third, fourth, fifth, sixth and seventh cervical roots should be done. If syringomyelia is considered, the suggested treatment is drainage of the myelic cavity.

PERIODIC EXFOLIATION OF SKIN

To the Editor:—A youth aged 18, whose past history is irrelevant concerning any acute or chronic illnesses with exception of the usual childhood diseases, has a severe exfoliation of the skin of both the anterior and posterior surface of the hands and feet which has developed once a year about the same time for the last five years. Shortly preceding this exfoliation there is a hyposthesia of epicritic sensation resembling that of peripheral neuritis. The skin then desquamates. Large casts of skin and cornified epithelium peel off almost like a glove. Occasionally this is accompanied by multiple furunculosis and small abscess formation in the subcutaneous tissues, necessitating incision and drainage. Regional adenopathy is present, probably due to secondary infection. The usual course of the desquamation is that it is free from pain and infection. Following the sloughing off of the thickened epithelium, a skin of normal texture is rapidly assumed and no further trouble is experienced until the following summer. The blood Wassermann reaction is negative, and urinary and blood counts are irrelevant. There is no evidence of trophic neurologic lesions, and no spina bifida is present. The course of the disease might be summarized as beginning more or less like a simple peripheral neuritis, followed by the desquamation of the skin. The curious thing about this is the yearly occurrence: the condition has been present now for five summers. I am wondering what suggestions you might make concerning a definite diagnosis, as I have never before seen anything exactly like it.

M.D., Ohio.

ANSWER.—It would be of interest to know more about the prodromal manifestations of these attacks. Comment is made of hyperesthesia, but nothing is said about erythema or vesiculation or any change in the skin itself previous to exfoliation. In the next to the last sentence there is an insinuation that this occurs in the summertime. The seasonal incidence is of interest but aids little in the diagnosis. The symmetrical involvement of the distal portions of the hands and feet suggests a toxic affair, but the description given does not agree with the usual manifestations of erythema multiforme, which frequently occurs in the spring of the year, involving the hands and occasionally the mouth or feet. The multiple abscesses are undoubtedly secondary infection and are only a complication of the original cutaneous condition. A definite diagnosis cannot be made on the information given. Further details of the onset would be of interest.

The suggestion is made, if the condition has occurred in approximately the same month each year, that a course of calcium, either as lactate or gluconate, for a period of six to eight weeks previous to the usual onset might be tried out.

SEVERE INTERMENSTRUAL PAIN

To the Editor:—An unmarried white woman aged 31 for the past eight years has had recurrent attacks of pain in the lower part of the abdomen. These attacks at first came on infrequently but now occur regularly midway between her periods. They come on suddenly and for the first twelve hours are severe, being essentially gone within twenty-four hours. Physical examination during and between attacks gives essentially negative results, except for moderate tenderness in the abdomen more distinct in the pelvic vaults. During the attack the white blood cell count rises, having been 16,000 on at least one occasion. I assume that this is mittelschmerz but have never seen it so severe. Have you any suggestions as to therapy?

Franklin K. Paddock, M.D., Pittsfield, Mass.

ANSWER.—It is well recognized that the pain associated with ovulation is sometimes severe. It is known to have been responsible for mistaken diagnoses of acute appendicitis or ruptured ectopic pregnancy; as a result, unnecessary operations have been performed. In most cases only symptomatic treatment is justifiable. This consists of giving anodynes such as acetylsalicylic acid and codeine in sufficient doses and the application of heat to the abdomen. In some cases avoidance of activity and rest in bed are helpful during the fastigium of the ordeal. Inter-menstrual pain or mittelschmerz frequently ceases spontaneously without any therapy. Since this is not always true, the physician should keep in mind that whatever treatment is adopted may have to be repeated over a long period of time. Unfortunately, there is no way of preventing periodic intermenstrual pains altogether except by such unwarrantedly drastic means as the use of large doses of estrogens or androgens to suppress menstruation, irradiation of the ovaries or hysterectomy.

NONTROMBOCYTOPENIC PURPURA

To the Editor:—A patient has marked fragility of the blood vessels. All tests, including prothrombin, are normal. He does well on excessive doses of ascorbic acid but it seems to help only temporarily. I will appreciate it if you can give me any help in this case.

William V. Vander Voort, M.D., Battle Creek, Mich.

ANSWER.—With the data at hand, this case would probably fall into the classification of nontrombocytopenic purpura. Treatment depends on discovering the cause. Many cases are secondary to infection, drugs, allergic conditions or endocrinopathies. Frequently no cause can be discovered. Many forms of treatment have been suggested for the variety of unknown cause, but none are effective in more than a small percentage of cases.

TREATMENT OF CAVERNOUS HEMANGIOMA OF LIP

To the Editor:—A boy aged 5 years has a vascular nevus (cavernous type) involving the right half of his upper lip. It is quite noticeable as a bluish discoloration and swelling along the mucous membrane of the lip and extends upward from mucous membrane about 1 inch. Inside the lip the enlarged vessels are quite prominent and not unlike the appearance of hemorrhoids. Two years ago I ligated and excised a portion of one of the most prominent veins. This greatly improved the appearance of the lip, but there has been an increase in the prominence of the veins during the last year. What method of treatment is recommended for this condition? Would the injection of quinine and urea hydrochloride or sodium morrhuate, as used in the treatment of hemorrhoids, be of value in this condition? Would there be any contraindication or danger in using them in the mouth?

M.D., Illinois.

ANSWER:—The best method of treatment in a case such as this would be with radium in skilled hands. The injection treatment of cavernous hemangiomas (Light, S. E.: *The Injection Treatment of Cavernous Hemangiomas*, *Arch. Dermat. & Syph.* 24:992 [Dec.] 1931); is not advised in a lesion of the upper lip because of the danger of baneful sequelae if an accidental extravascular injection was made and an inflammatory reaction with sloughing took place. The majority of patients with angiomas may be successfully treated with radium.

FISSURE OF LIP

To the Editor:—A boy aged 17 has a midline fissure of three years' duration on both the upper and the lower lip. Many ointments, the cautery and other measures have been tried, and he has had three applications of radium by a competent radium therapist. It is now three months since treatment, and there has been no improvement. More radium therapy has been advised, but because there has been no healing I have cautioned against this. I have contemplated the removal of the fissure and the underlying scar and shifting the center of the lip about ¼ inch (0.6 cm.) to one side. Any suggestion for treatment and comment on irradiation and possible surgical treatment will be appreciated.

M.D., Kimball, Neb.

ANSWER:—Assuming that the patient has negative serologic reactions for syphilis, the fissures probably did not heal because of the fibrosis laid down by the original infection. More scarring, with further diminution in local circulation, has undoubtedly followed the radium therapy. With the foregoing facts in mind, more irradiation should not be given. The lesions will probably heal with primary union if they are excised back to healthy tissue and the edges of the wound sutured. Notching the vermilion borders as in the Mirault cleft lip operation gives a better cosmetic result.

DECREASE OF POTENCY IN MAN OF SIXTY

To the Editor:—What treatment would you suggest for a partial loss of power of erection in a 60 year old man? Several years ago he had an attack of mumps with orchitis and atrophy of one testis. Ever since then he has had weak erections and premature ejaculations. Libido is normal. Please discuss the use of Oreton in this case. Would injections of Lyden Harrower be of use?

M.D., Virginia.

ANSWER:—The proper approach to a case like this is to perform a complete physical examination. Patients who suffer from organic disease may have symptoms referred to the sexual organs; for example, beginning tabes, pernicious anemia, leukemia or Banti's disease. The common cause of loss of power of erection in a man of 60 years is age, and this patient may be older for his years than he should be. Patients with this symptom may suffer from benign hypertrophy of the prostate, chronic prostatitis, chronic seminal vesiculitis and the like. Therefore, in addition to a really complete physical examination a local examination is in order.

Oreton or Lyden Harrower cannot be recommended.

VERNES' TEST FOR SYPHILIS

To the Editor:—Why is it that the Vernes test for syphilis, involving direct measurement of pallidin from the blood and the use of perethynol, has not been more widely adopted? French authorities emphasize its value because it gives exactitude in diagnosis and helps in prognosis. And as a guide for treatment. Are there any scientific and well grounded reasons that prevent its common use in laboratories?

Eduardo Labastida K., M.D., Los Mochis, Sinaloa, Mexico.

ANSWER:—Unquestionably the main reason why the Vernes test for syphilis has not been adopted on a wide scale is that it is not as dependable as other available tests. Dr. Vernes participated in the serologic conference of the League of Nations Health Organization held at Copenhagen in 1928. His test, to which he refers as the syphilimetric method, proved in his own hands to be of extremely low sensitivity and not entirely specific. In addition, the technic of the test is highly complex and requires costly apparatus.

BEE STING AND DETACHED RETINA

To the Editor:—Can a bee sting to the upper lid produce a detachment of the retina? Reason: A man is stung by a bee on the upper lid. 4 days later did he see a physician. The physician noted only slight swelling of the upper lid and no signs of irritation or inflammation of the globe. The patient is now making a claim for compensation.

Leonard A. Hulsebosch, M.D., Glens Falls, N. Y.

ANSWER:—It is extremely improbable that there could be a causal relationship between a bee sting of the eyelid and a detachment of the retina. As nearly 50 per cent of the cases of retinal detachment are of unknown etiology, it has become somewhat of a habit to attribute a retinal detachment to any sort of a trauma within 18 inches of the eye, almost regardless of the time of occurrence. It would be fairly safe to say that in the instance cited the bee sting is not related to the retinal detachment.

ROENTGEN RAYS FOR LOCALIZED HYPERHIDROSIS

To the Editor:—A healthy single woman aged 23 complains of increased foot perspiration, especially in her arm pits, for seven months. Before coming to me she had six roentgen ray treatments beneath her arms at two week intervals for the first four, and then monthly, and she has appointments for more. The roentgen therapy did not affect the axillary hair, nor did she improve. She appears to be neurotic. Are roentgen ray treatments beneath the arms a recognized and efficacious treatment for excess perspiration? Would the roentgen rays affect the sweat glands and still leave the hair intact?

M.D., New York.

ANSWER:—Yes, roentgen therapy is recognized as a safe and efficient treatment of localized hyperhidrosis, affecting the sweat glands without any ill effect on the hair. It is assumed that the treatment is given with proper precautions by a competent roentgen therapist, who should be a dermatologist. See MacKee, G. M.: *X-Rays and Radium in the Treatment of Diseases of the Skin*, ed. 2, Philadelphia, Lea & Febiger, 1927, page 545.

GLAUCOMA AND FEVER

To the Editor:—A patient aged 73 who has glaucoma of the right eye has a temperature of 99.2 to 100.3 F. every night. Is this commonly due to glaucoma, or do patients usually have a fever with this condition?

M.D., Massachusetts

ANSWER:—A temperature of 99 to 100.3 F. is certainly not due to glaucoma. Fever never seems to be caused by glaucoma itself. The presence of such a rise in temperature would suggest some other source of infection which might itself be a possible factor in producing a secondary type of glaucoma. It is doubtful, however, that it would be any factor in glaucoma of a simple noninflammatory type.

POSITION OF INFANT IMMEDIATELY AFTER BIRTH

To the Editor:—Following normal delivery of a child with some mucus in its mouth and the use of suction, in what position should the child be placed, temporarily, head or feet down?

M.D., New Jersey.

ANSWER:—It is good practice to hold the head of the baby down as it is delivered, so that it will more easily clear its air passages during the initial respiratory efforts. Once the air passages have been cleared and there is no respiratory embarrassment, the head of the baby need be neither up nor down.

DOUBLE-YOLKED HEN'S EGGS

To the Editor:—We sometimes find an egg with a double yolk. When such an egg hatches, what is the nature of the progeny?

Robert T. Morris, M.D., Stamford, Conn.

ANSWER:—Double-yolked hen's eggs are not uncommon. When such eggs are fertilized, the two yolks develop separately as a pair of fraternal twins. Because of crowding in the later stages of embryonic development, however, they rarely if ever hatch as two living normal chicks.

ADENINE SULFATE

To the Editor:—In the January 24 issue of *The Journal*, page 338, the statement is made that adenine sulfate is difficult to obtain and probably can be had only for experimental purposes. I have had no difficulty in obtaining adenine sulfate from the Eastman Kodak Company, Rochester, N. Y., in 10 Gm. lots or less. May I also correct the sentence "Reactions do occur when it is used intravenously." The only reaction obtained with this product is local irritation if some of the material is injected around the vein. In my experience, no constitutional reactions have been obtained. I agree with you that the diagnosis of acute agranulocytosis in the case in question is improbable for the reason you mention. I also believe that none of the remedies suggested have been proved to be specific.

Paul Reznikoff, M.D., New York.

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HISTONE ZINC INSULIN, GLOBIN (ZINC) INSULIN AND CLEAR PROTAMINE ZINC INSULIN

A COMPARATIVE STUDY OF THEIR ACTION

C. CABELL BAILEY, M.D.

AND

ALEXANDER MARBLE, M.D.

BOSTON

The protamine zinc insulin which has been on the market since February 1937 is only one of many modifications of insulin possible to the chemist. It was selected for general sale and distribution because, of the preparations available at the time, it offered the most in the way of a desirable physical state, stability and an even, prolonged effect. However, work has continued in various laboratories in the attempt to find a preparation which is superior to this modification of insulin. It is our purpose in this paper to report the results which we have observed with three of these newer insulins: histone zinc insulin, globin (zinc) insulin and clear (soluble) protamine zinc insulin.

In common with many clinicians, we regard turbid (market) protamine zinc insulin as a highly satisfactory product. In this clinic its use alone or in combination with crystalline insulin (solution of zinc insulin crystals) or amorphous ("regular") insulin has been, and is, enthusiastically sponsored. With this preparation it has been possible to secure good to excellent control of the condition of most diabetic persons at relatively little inconvenience to the patient. However, it presents certain minor disadvantages: 1. Since it is a suspension rather than a solution, to insure thorough mixing of the contents the vial must be carefully and gently shaken before each dose is withdrawn. If this is not done, accurate sampling of the contents of the vial is not possible. Since the majority of diabetic patients have had little or no scientific training, it is likely that some variation in dosage occurs from day to day, although clinical results indicate that this source of error is relatively slight. 2. It is not indefinitely stable, although the loss in potency proceeds so slowly, even at room tempera-

ture, that from a practical standpoint this is of small consequence. 3. Because of its slowness of action, it is often necessary to give an accompanying injection of rapidly acting insulin, either amorphous or crystalline. 4. In patients with severe diabetes it is at times difficult to control glycosuria in the late afternoon and early evening if one follows the usual, convenient plan of giving all insulin before breakfast and none during the rest of the day. 5. Untoward local (allergic) cutaneous responses, although usually mild, are relatively common and at times annoying. 6. A final disadvantage, which can be overcome by careful adjustment of dosage and the giving of a bedtime lunch, is that of hypoglycemic reactions during the night.

Histone insulin is prepared by adding to insulin the simple protein histone, derived from thymus. Although worked with to some extent by Hagedorn and his associates,¹ it was first used in clinical trials by Biasotti, Deulofeu and Mendive² and by Gray, Bischoff and Sansum.³ Both of these groups found that histone insulin has a prolonged action. Recently Barnes, Cuttle and Duncan⁴ reported their results with a preparation to which zinc had been added; they found that the hypoglycemic effect of histone zinc insulin, although prolonged, is somewhat more prompt in onset than that of protamine zinc insulin. They conclude that with histone zinc insulin it is "possible to secure a continuously normal blood sugar level and a freedom from glycosuria in a larger number of patients after a single morning injection" than with a single morning injection of unmodified or of protamine zinc insulin.

Globin insulin was first prepared by Reiner, Searle and Lang⁵ by combining insulin with globin, a simple protein obtained from erythrocytes by removing the iron-containing chromogen fraction. These workers found that in rabbits the action of globin insulin was more than twice as long as that of regular insulin. In the first report of the use of this preparation clinically, Bauman⁶ stated that patients with mild or moderately severe diabetes were adequately controlled on a single daily injection and emphasized that no local cutaneous responses were observed. Since these papers of Reiner and his associates and of Bauman in 1939, reports regarding the use of globin (zinc) insulin have been

Miss Rachel M. Smith supervised the chemical analyses. Mrs. Todd Crane Smith gave technical assistance.

From the George F. Baker Clinic, Elliott P. Joslin, M.D., Medical Director, New England Deaconess Hospital.

Because of lack of space, this article is abbreviated in THE JOURNAL by the omission of the majority of charts, tables and reports of cases. The complete article appears in the authors' reprints.

The hospital expenses of the patients and the salaries of Mrs. Rita M. Reed and of five part time workers who gave technical assistance were paid by Eli Lilly & Co. and by Burroughs, Wellcome & Co. (U. S. A.), Inc. Histone zinc insulin and clear protamine zinc insulin were supplied by Eli Lilly & Co.; the turbid protamine zinc insulin and crystalline insulin were of market variety and were also supplied without cost by Eli Lilly & Co. The globin (zinc) insulin was supplied by Burroughs, Wellcome & Co. (U. S. A.), Inc., for investigational use. All insulin preparations were stated by the manufacturers to contain 80 units per cubic centimeter.

1. Hagedorn, H. C., Jensen, B. N., Krarup, N. B., and Wodstrup, I. Protamine Insulinate, *J. A. M. A.* **106**: 177 (Jan. 18) 1936.

2. Biasotti, Alfredo; Deulofeu, Venancies, and Mendive, J. R.: Action of Histone Insulin on the Blood Sugar, *Prensa med. argent.* **24**: 1122 (June 2) 1937.

3. Gray, P. A.; Bischoff, Fritz, and Sansum, W. D. Treatment of Diabetes Mellitus with Insoluble Insulin Compounds: II. Histone Insulin, *Ann. Int. Med.* **11**: 274 (Aug.) 1937.

4. Barnes, C. A., Cuttle, T. D., and Duncan, G. G. Histone Zinc Insulin—Its Pharmacologic Characteristics and Its Application in the Treatment of Diabetes Mellitus, *J. Pharmacol. & Exper. Therap.* **72**: 331 (Aug.) 1941.

5. Reiner, L.; Searle, D. S., and Lang, E. H.: Insulin Preparations with Prolonged Activity: I. Globin Insulin, *Proc. Soc. Exper. Biol. & Med.* **40**: 171 (Feb.) 1939.

6. Bauman, Louis: Clinical Experience with Globin Insulin, *Proc. Soc. Exper. Biol. & Med.* **40**: 170-171 (Feb.) 1939.

made by Marks,⁷ by Andrews and Groat⁸ and by Bauman⁹ in a second publication. More recently Duncan and Barnes¹⁰ announced their results of a study of globin (zinc) insulin on 5 patients; they state that its speed and length of action lie between that of regular or crystalline insulin and that of turbid protamine zinc

TABLE 1.—Characteristics of Insulins Studied

Insulin	Source of Added Protein *	Character	pH	Composition per 100 Units of Insulin	
				Added Protein,* Mg.	Zinc, Mg.
Histone zinc.....	Thymus	Turbid	7.0±	3.2	0.2
Globin (zinc) . . .	Beef blood	Clear	3.7	3.75	0.31
Clear protamine zinc	Salmon sperm	Clear	3.3-3.5	3.8	0.31
Turbid protamine zinc	Salmon sperm	Turbid	7.0±	1.25	0.2
Crystalline .	None	Clear	3.0-3.5	None	>0.02 <0.04

* Histone, globin or protamine.

insulin. They found that the hypoglycemic effect of globin (zinc) insulin begins soon after injection and gradually increases in intensity until between the eighth and the twelfth hour, at which time the effect begins to subside. They believe that, unit for unit, globin (zinc) insulin has a quantitatively greater effect than protamine zinc insulin.

Clear (soluble) protamine zinc insulin was prepared first for clinical trial in 1936 in the Lilly Laboratories by Mr. George B. Walden by adjusting the p_H at from 3.3 to 3.5 and adding more protamine, zinc and glycerin than is present in turbid protamine zinc insulin. It is a water-clear preparation. Although it has been used on a small group of patients in this clinic for more than three years, no statements have heretofore been published regarding the results obtained.

TABLE 2.—Data Regarding Patients Used as Subjects in Study

Patient; Sex; Age, Years	Net Weight, Kg.	Net Height, Cm.	Onset of Diabetes	Insulin Dose at Dis- charge	Diet During Study			
					Car- boby- drate	Pro- tein	Fat	Calo- ries
1 G. T. ♂ 30	58.6 (129 lbs)	179.5 (71 in)	1928	8* + 40 †	185	91	115	2,139
2 M. H. ♀ 47	55.0 (121 lbs)	155.6 (62¼ in)	1924	40 †	152	83	98	1,622
3 D. F. ♂ 22	45.8 (101 lbs)	147.5 (59 in)	1928	18* + 40 †	211	106	122	2,366
4 R. M. ♂ 19	61.8 (136 lbs)	181.2 (72¼ in)	1928	52 †	184	130	133	2,453
5 A. S. ♂ 23	54.0 (119 lbs)	168.1 (67¼ in)	1932	80 †	152	84	120	2,028

* Crystalline insulin † Protamine zinc insulin. ‡ Histone zinc insulin

CHEMICAL METHODS

The determination of blood sugar was made on capillary samples by the micro procedure of Folin and Malmros.¹¹ Smith's¹² modification of Benedict's method

7. Marks, H. E.: A New Globin Insulin: The Importance of Carbohydrate Distribution in the Control of Diabetes with the Modified Insulins. *M. Clin. North America* 24: 649 (May) 1940.
8. Andrews, G. B., and Groat, W. A.: Globin Insulin: A Clinical Study. *New York State J. Med.* 40: 913 (June 15) 1940.
9. Bauman, Louis. Clinical Experience with Globin Insulin, *Am J. M. Sc.* 198: 475 (Oct.) 1939.
10. Duncan, G. G., and Barnes, C. E.: Globin Insulin, *Am J. M. Sc.* 202: 553 (Oct.) 1941.
11. Folin, Otto, and Malmros, H.: An Improved Form of Folin's Micro Method for Blood Sugar Determinations, *J. Biol. Chem.* 83: 115 (July) 1929.
12. Smith, M.: A Micromodification of the Method of Benedict for the Quantitative Determination of Reducing Sugar in Urine, *J. Lab. & Clin. Med.* 7: 364 (March) 1922.

for the determination of the percentage of sugar in urine was used. The total nitrogen in the urine was determined by Folin's¹³ micro Kjeldahl method.

PLAN OF INVESTIGATION

Five diabetic patients, 4 men and 1 woman, with moderately severe or severe diabetes, remained in the hospital from seventy-four to one hundred and thirty-two days as subjects for these studies. All 5 patients were known to have had diabetes for more than ten years, with the exception of A. S., who had had the condition nine and three-tenths years. All were intelligent, cooperative, thoroughly reliable and trustworthy and had no significant complications. Four subjects were young, active adult men aged 19 to 30 and 1 was an active woman aged 47.

During the entire study the patients were ambulatory and, as far as practicable, took the same amount of exercise each day. The diet for each patient was kept the same throughout the study as far as the amount of carbohydrate, protein and fat and the total number of calories per twenty-four hours were concerned. The carbohydrate, which varied in amount in different

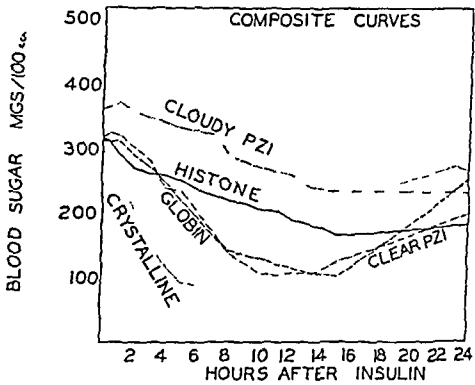


Chart 6—Composite curves Each of the curves represents the composite effect of single subcutaneous injections of insulin into the 5 fasting diabetic subjects whose individual curves are shown in charts 1 to 5. The curve for histone zinc insulin is a composite of ten curves, globin (zinc) insulin ten curves, turbid protamine zinc insulin four curves, clear protamine zinc insulin nine curves and crystalline insulin six curves. Blood sugar determinations were made hourly from 8 a. m. until 11 p. m. or 12 midnight and then again at 7 and 8 a. m. the following morning. No food was given during the test. In 3 cases 0.15 unit of insulin per kilogram of body weight was given on separate days; in 2 cases (A. S. and D. F.) 0.20 unit per kilogram was used. No blood samples were taken between the fifteenth and the twenty-third hour.

patients from 152 to 211 Gm. a day, while kept constant in total quantity per day was varied from time to time in distribution between meals in order to allow each insulin the most favorable conditions for action.

The urine was examined qualitatively for sugar at 6:30, 9:30 and 11:30 a. m. and at 2:30, 4:30, 7:30 and 9:30 p. m. daily. In addition, the entire amount of urine voided in twenty-four hours was collected daily and its content of sugar and nitrogen determined.

Except on special test days when hourly samples were taken, blood was obtained for analysis of its sugar content at 7 and 11 a. m. and at 2, 5 and 10 p. m. daily throughout the study. On these days of maintenance the insulin under study at the time was given before breakfast and the patient regulated as well as possible on this single morning dose. The distribution of carbohydrate in the diet was altered slightly from time to time to allow the most favorable action of the insulin under study. Each type of insulin was used from seven to thirty-two days (average fifteen days) by each

13. Folin, Otto. Micro Kjeldahl Colorimetric Method for the Determination of Total Nitrogen in Urine, *Laboratory Manual of Biological Chemistry*, ed. 5, New York, D. Appleton-Century Company, 1934, p. 145.

patient. Every effort was made to obtain the best possible control with each type of insulin.

In addition to studying the action of each insulin in day by day maintenance, tests were carried out on special fast days during which the patient received no food for about thirty-eight hours. These special test days followed several days of regulation on crystalline insulin to avoid the overlapping effect of the longer acting insulins. As a result, the 8 a. m. blood sugar at the beginning of the test was usually fairly high. After two control blood samples had been taken, the insulin under study (always of U-80 strength) was given subcutaneously with a 1 inch, 27 gage needle and a 0.25 cc. syringe having a scale-bearing portion 3.6 to 5 cm. long divided into ten equal parts. Three patients received 0.15 unit, and 2 (A. S. and D. F.) 0.2 unit, of insulin per kilogram of body weight, thus making the dose 7 to 11 units. Following the injection of insulin, samples of blood for the determination of sugar were obtained at one-half hour, one hour and then at hourly intervals thereafter throughout the day until 11 p. m. or midnight. Hourly tests were then discontinued until 7 and 8 a. m. the next morning when two final determinations were made. Following this, the usual breakfast and insulin were given. During these special test days the patients were confined to the hospital floor and took only water and black coffee or weak tea without milk or sugar. These special test days were at least three and usually five or six days apart, because they were disagreeable for the patient and because he lost from 2 to 7 pounds (900 to 3,175 (Gm) on those days.

RESULTS

A. Effect of a Single Subcutaneous Injection of Insulin During a Day of Starvation.—The accompanying ten charts with their legends show concisely the results of the investigation. Charts 1 through 5 show the level of the blood sugar determined hourly during the fast days on each patient. Besides comparing the actions of the insulins one with another, these graphs compare the experimental insulins with the market turbid protamine zinc insulin and the market crystalline insulin.¹⁴ Each curve represents the composite result of two separate tests done on different days on that patient. Chart 6 represents the composite curves of all the tests on all the patients. The histone curve is a composite of ten tests, the globin of ten tests, the clear protamine zinc insulin of nine tests, the crystalline of six tests and the turbid protamine zinc insulin of four tests.

Histone Zinc Insulin: From a study of charts 1 to 6, it is evident that on fast days the action of histone zinc insulin began approximately one-half hour after subcutaneous injection, and within two hours the blood sugar showed a definite initial fall of approximately 45 mg. per hundred cubic centimeters. This initial action, evident in 4 of the 5 patients (all except M. H.) and due probably to the presence of some soluble insulin in the preparation, may explain why on days of maintenance histone zinc insulin allows less rise in blood sugar following breakfast than globin (zinc) insulin, clear protamine zinc insulin and turbid protamine zinc insulin. Following the initial fall there was a gradual

even decrease in the blood sugar until about the fifteenth hour. Since no blood sugar estimations were made from midnight until 7 a. m. the next morning, the exact hour of the night at which the lowest blood sugar occurred cannot be stated definitely. In 3 cases, however, the blood sugar the following morning (twenty-two and one-half hours after injection of insulin) was on the average 41 mg. per hundred cubic centimeters¹⁵ lower than at fifteen hours. A. S., the patient with the

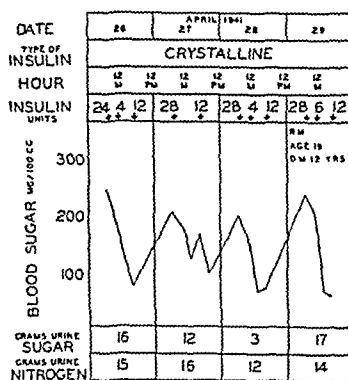
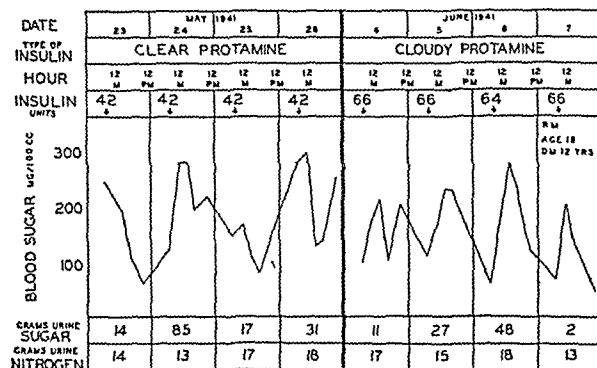
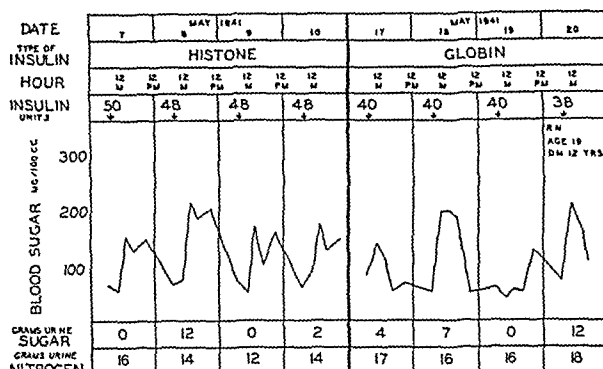


Chart 10 (case 4).—R. M. (for personal data see legend of chart 4). Previous insulin dose was 8 units of crystalline and 36 units of protamine zinc insulin. He was in good health and had no other illness. He remained in the hospital one hundred and four days (March 17 to June 12, 1941) for this investigation. During this study his diet consisted of carbohydrate 184 Gm, protein 130 Gm, and fat 133 Gm, a total of 2,453 calories. The carbohydrate distribution with each of the insulins studied was as follows: histone zinc insulin 56, 59, 0 (3 p. m.), 59, 10; globin (zinc) insulin: 46, 69, 10 (3 p. m.), 50, 10; turbid protamine zinc insulin: 46, 69, 10 (3 p. m.), 50, 10; clear protamine zinc insulin: 46, 69, 10 (3 p. m.), 50, 10; crystalline insulin 56, 50, 0 (3 p. m.), 56, 10.

most severe diabetes, showed by the twenty-third hour an increase in blood sugar of 65 mg. per hundred cubic centimeters, which would indicate that the lowest level

¹⁴ Crystalline insulin refers to the market "solution of zinc insulin crystals" and was used as the quick acting insulin in this investigation. Studies made by Marble and Vartainen (Crystalline Insulin, J. A. M. A. 113:1303 [Sept. 30] 1939) and by Ricketts and Wilder (Solutions of Amorphous Insulin and Solutions of Zinc Insulin Crystals, ibid. 113:1310 [Sept. 30] 1939) have shown that the action of crystalline insulin and regular insulin are, for practical purposes, identical.

¹⁵ We realize fully the danger in quoting here and subsequently in the paper figures obtained by averaging values obtained on only 2 to 7 patients, particularly since the blood sugar is influenced by so many factors. However, since such averages are helpful and significant in indicating gross trends, they are presented for this purpose.

was reached during the night and that the blood sugar was rising. The fact that the rise was slight would indicate that there was still some effect of the histone zinc insulin present twenty-four hours after injection.

Globin (Zinc) Insulin: The onset of action of globin (zinc) insulin usually began in approximately one hour. Thereafter there was a steady and fairly rapid fall in the blood sugar until the eighth to the tenth hour, after which there was a slight and gradual fall until the fifteenth hour (following which blood sugar determinations were discontinued until 7 a. m. the next day) in 3 patients (G. T., M. H., D. F.). In 1 (A. S.) the blood sugar remained constant from the eleventh to the fifteenth hour. In the other patient (R. M.) the blood sugar remained almost constant between the eighth and the fifteenth hour, rising only 15 mg. per hundred cubic centimeters during that period. In all except 1 (G. T.) the twenty-three hour blood value was definitely higher than that at the fifteenth hour, with an average difference of 154 mg. per hundred cubic centimeters. In G. T., the patient with the mildest diabetes, there was a slight drop in blood sugar of 15 mg. between the fifteenth and the twenty-third hour.

From these data, it appears that the greatest action of globin (zinc) insulin occurs in less than twenty-four hours and that its action begins wearing off between fifteen and twenty-four hours after injection.

Clear Protamine Zinc Insulin: The effect of clear protamine zinc insulin was remarkably similar to that of globin (zinc) insulin on the fast days. At approximately one hour after injection there began a steady and moderately rapid drop in blood sugar which in 4 of the 5 patients reached the lowest level in ten to eleven hours. From the tenth to the fifteenth hour the blood sugar remained almost constant except in the case of G. T., whose blood sugar continued to drop slowly during this period. In every case there was a definite rise in blood sugar from the fifteenth to the twenty-third hour, averaging 94 mg. per hundred cubic centimeters for all cases.

B. Results During Periods of Maintenance.—Four of the 5 special study patients were given a single daily dose of each of the insulins under study for a total of seven to thirty-two days while on a constant diet. Determinations of the blood sugar were made five times a day. For purposes of analysis we have chosen those three or four days during which the diabetic condition was best controlled on each of the insulins; charts 7 to 10 show these results.

In addition to these 4 patients, we attempted to regulate the diabetic condition of 7 hospitalized patients with histone zinc insulin, 7 others with globin (zinc) insulin and 7 others with clear protamine zinc insulin. These patients received a constant weighed diet, had the quantity of sugar in the urine determined daily and had frequent blood sugar tests taken, but the study was less rigidly controlled than with the 4 original patients.

Histone Zinc Insulin: The diabetic condition of the 4 special study patients maintained on histone zinc insulin was uniformly well controlled with an average excretion of sugar in the urine of only 5 Gm. a day during the periods of best control, as shown in charts 7 to 10. The fasting blood sugar values were almost always well within normal limits, indicating that the insulin given the day before prevented nocturnal hyperglycemia and allowed the patient to begin the day with a normal blood sugar level.

The rise in blood sugar from the fasting level to that at 11 a. m. was slight with histone zinc insulin (charts 7

to 10). This rise, which is usually fairly large when a single dose of turbid protamine zinc insulin has been given before breakfast, averaged only 6 mg. per hundred cubic centimeters with the histone zinc insulin as compared to 100 mg. per hundred cubic centimeters with the turbid protamine zinc insulin on the same patients and under the same conditions of study.

With histone zinc insulin the blood sugar rose between 11 a. m. and 2 p. m. an average of 48 mg. per hundred cubic centimeters, as compared with a similar rise of 56 mg. per hundred cubic centimeters with turbid protamine zinc insulin. Between 2 and 5 p. m. the blood sugar value fell an average of 43 mg. per hundred cubic centimeters with histone zinc insulin as compared with a 67 mg. per hundred cubic centimeters fall with turbid protamine zinc insulin. In 3 of the 4 cases there was an average rise with histone zinc insulin of 31 mg. per hundred cubic centimeters between 5 and 10 p. m. This was followed by a slight and gradual fall in blood sugar throughout the night, resulting in a normal fasting blood sugar. In 1 case (D. F.) instead of a rise in blood sugar between 5 and 10 p. m. there was a fall averaging 36 mg. per hundred cubic centimeters. This was followed by a slight rise during the night, but despite this the fasting blood sugar values were within normal limits.

Globin (Zinc) Insulin: This was next used for regulation of the diabetic condition of the 4 subjects selected for special study. Two patients (G. T. and M. H.) were given three meals and a bedtime lunch daily. The other two (D. F. and R. M.) were given three meals and a lunch containing 10 Gm. of carbohydrate at 3 p. m. but no bedtime feeding. The giving of a lunch in the midafternoon rather than at bedtime unmistakably provided a better distribution of food for globin (zinc) insulin.

The fasting blood sugar was almost always normal when globin (zinc) insulin was used, indicating that the effect of this insulin lasted for approximately twenty-four hours (charts 7 to 10). Between 7 and 11 a. m. there was a sharp rise in blood sugar of all 4 patients, averaging 90 mg. per hundred cubic centimeters; the average rise in the 2 patients receiving no midafternoon lunch was 100 mg. and in the 2 receiving an afternoon lunch 80 mg. per hundred cubic centimeters. From 11 a. m. to 2 p. m. the blood sugar rose slightly in 2 cases (G. T. and M. H.) and fell slightly in 2 (D. F. and R. M.) The average change was a rise of 11 mg. per hundred cubic centimeters.

The change in blood sugar between 2 and 5 p. m. depended on whether or not a midafternoon lunch was given. In the 2 cases in which no lunch was given (G. T. and M. H.) there was a rapid, sharp fall in blood sugar averaging 140 mg. per hundred cubic centimeters. In the 2 cases receiving the midafternoon lunch the average fall in blood sugar was only 27 mg. per hundred cubic centimeters. The great importance of a midafternoon lunch is thus illustrated. There was a further slight fall in blood sugar between 5 and 11 p. m. averaging 26 mg. per hundred cubic centimeters.

It may be stated that the diabetic condition of the patients maintained on globin (zinc) insulin and given an afternoon lunch was well controlled. Glycosuria was absent or slight, and blood sugar values were satisfactory.

Clear Protamine Zinc Insulin: The same 4 patients were given single morning doses of clear protamine zinc insulin in an attempt to regulate the diabetic condition with this preparation. One patient (D. F.) maintained

on three meals alone was the best regulated of the group. Two patients (G. T. and M. H.) took bedtime lunches in addition to their three meals. The fourth patient (R. M.) took a lunch yielding 10 Gm. of carbohydrate at 3 p. m. in addition to the three regular meals. Because of hypoglycemic reactions in the evening, a bedtime lunch was later added.

While the patients were receiving this insulin the fasting blood sugar values were often quite high and regulation of the diabetic condition was difficult. This seemed to indicate that the length of action of clear protamine zinc insulin was less than twenty-four hours. With this type of insulin, the rise in blood sugar between 7 and 11 a. m. was small or large, depending on the height of the fasting blood sugar, averaging 113 mg. per hundred cubic centimeters. The blood sugar fell between 11 a. m. and 2 p. m. with an average drop of 38 mg. per hundred cubic centimeters. From 2 to 5 p. m. there was an average decrease of 112 mg. per hundred cubic centimeters. The latter fall often lowered the blood sugar to hypoglycemic levels. A midafternoon lunch was given to 1 patient (R. M.) and the fall in blood sugar was cut in half. With the use of clear protamine zinc insulin a midafternoon lunch seems definitely indicated. Between 5 and 10 p. m. there was usually very little change in blood sugar values, the average being a negligible rise of 8 mg. per hundred cubic centimeters. During the night there was usually a slight to moderate rise in blood sugar resulting in a relatively high fasting level. A bedtime lunch should not be given with clear protamine zinc insulin if it can be avoided.

Turbid Protamine Zinc Insulin: The market variety of protamine zinc insulin was next given to each of 3 patients under special study. The diabetic condition was controlled as well as possible with a single morning dose of this insulin.

TABLE 8.—Results Obtained with Histone Zinc Insulin in Case 11

Date, 1941	Histone Zinc Insulin, Units	Blood Sugar, Mg. per 100 Cc.			Sugar in Urine, Gm. in 24 Hours
		Fasting	11 A. M.	4 P. M.	
July 27	80	...	...	...	41
30	100	...	170	240	42
31	100	147	...	...	65
August 1	110	...	97	190	16
2	120	167	...	...	52
6	120	90	112	110	19

The fasting blood sugar values were uniformly within normal limits and on the four consecutive days of best control the fasting blood sugar of the patients averaged 75 mg. per hundred cubic centimeters. This indicates that protamine zinc insulin acts throughout the night and allows a normal fasting blood sugar level.

Between 7 and 11 a. m. the blood sugar rose an average of 100 mg. per hundred cubic centimeters, indicating that this insulin does not act quickly enough to prevent hyperglycemia after breakfast. From 11 a. m. until 2 p. m. the blood sugar continued to rise; the average increase in the 3 patients was 56 mg. per hundred cubic centimeters. The blood sugar level fell from 2 until 5 p. m. with an average drop of 67 mg. per hundred cubic centimeters and then decreased slightly between 5 and 10 p. m. with an average fall of only 9 mg. per hundred cubic centimeters. With turbid protamine zinc insulin the blood sugar level continued to fall gradually throughout the night, indicating the prolonged action of this type of insulin.

C. Results of Further Clinical Trial.—In addition to the 5 patients, each of whom remained in the hospital for several months for this investigation, 21 other patients who remained in the hospital for much shorter periods were given the three insulins under investigation in order to obtain further clinical evidence concerning their action. Five patients were convalescing from infections of the feet and 1 from an infection of the scalp, but no patient had an infection active at the time of the study. One patient had been hospitalized because of a broken hip; the remaining 13 patients had no complications.

Seven patients received histone zinc insulin, 7 globin (zinc) insulin and 7 clear protamine zinc insulin. All 21 received a single daily injection in doses estimated to be adequate for control of the diabetic condition.

TABLE 9.—Results Obtained with Histone Zinc Insulin in Case 12

Date, 1941	Histone Zinc Insulin, Units	Blood Sugar, Mg. per 100 Cc.			Sugar in Urine, Gm. in 24 Hours
		Fasting	11 A. M.	4 P. M.	
August 4	70	...	...	202	75
5	80	115	204	196	41
6	90	...	...	...	...
8	90	106	83	130	4
10	90	60	93	...	14

Histone Zinc Insulin: The results obtained with histone zinc insulin were excellent, being comparable to those obtained on the five special study patients who remained a longer time. It was particularly encouraging to note that the diabetic condition of the 5 children, including 1 aged 26 months and 1 aged 11 months, was well controlled with a single dose of histone zinc insulin daily even though in 1 patient the amount was as great as 120 units in a single morning injection.

CASE 11.—B. D., a boy aged 13 years, weighing 48.6 Kg., had had diabetes for eight years. No complications were present. The former insulin dose was 26 units of crystalline plus 34 units of protamine zinc insulin daily, with fair diabetic control. The diet during the study consisted of carbohydrate 200 Gm., protein 100 Gm. and fat 100 Gm., totaling 2,100 calories daily. The carbohydrate distribution was 46, 10 (10 a. m.), 62, 10 (3 p. m.), 62, 10.¹⁶ The results obtained with histone zinc insulin are given in table 8.

CASE 12.—H. K., a boy aged 12 years, weighing 34.1 Kg., had had diabetes for four years. No complications were present. The former insulin dose was 20 units of crystalline and 40 units of turbid protamine zinc insulin daily with poor diabetic control. The diet during the study consisted of carbohydrate 184 Gm., protein 92 Gm. and fat 89 Gm., totaling 1,905 calories daily. The carbohydrate distribution was 35, 10 (10 a. m.), 59, 10 (3 p. m.), 54, 16. The results obtained with histone zinc insulin are given in table 9.

Globin (Zinc) Insulin: With this type the results were even more encouraging than those obtained in the 5 special study patients; the diabetic condition was well controlled on a single morning injection. Among the 21 additional hospital patients, the 7 who received globin (zinc) insulin showed approximately the same degree of rise in blood sugar between 7 a. m. and 11 a. m. as the 7 patients who received histone zinc insulin; it is true, however, that among the patients who received the latter type there were 4 with severe diabetes, whereas only 1 of those receiving globin (zinc) insulin required more than 40 units daily.

16. Indicates that 46 Gm. of carbohydrate was given at breakfast, 10 at 10 a. m., 62 at lunch, 10 at 3 p. m., 62 at supper and 10 at bedtime. A similar method of indicating carbohydrate distribution has been used in the case summaries which follow.

By giving a midafternoon lunch hypoglycemic reactions occurring in the afternoon were eliminated. Only one insulin reaction occurred; this was in case 13 (R. L.) in which 90 units of globin (zinc) insulin was given daily. This reaction occurred at 6 a. m. and thereafter in this case low blood sugar values in the early

TABLE 11.—Results Obtained with Globin (Zinc) Insulin in Case 14

Date, 1941	Globin (Zinc) Insulin, Units	Blood Sugar, Mg. per 100 Cc.			Sugar in Urine, Gm. in 24 Hours
		Fasting	11 A. M.	4 P. M.	
August 15	30	...	...	...	18
18	30	134	200	153	18
19	32	...	...	...	5
21	32	112	161	92	3
22	32	106	148	...	3

morning were avoided by giving a small bedtime lunch. This was the only patient receiving globin (zinc) insulin who required a bedtime lunch. The fact that the hypoglycemic reaction occurred at 6 a. m. showed that globin (zinc) insulin was effective for at least twenty-three hours. Only 1 patient, case 19 (G. S., a baby aged 21 months), failed to secure good diabetic control on globin (zinc) insulin.

CASE 14.—W. M., a man aged 22, weighing 70.9 Kg., had had diabetes for one year. No complications were present. The former insulin dose was 12 units of crystalline plus 24 units of protamine zinc insulin daily, with good diabetic control. The diet during the study was carbohydrate 161 Gm., protein 86 Gm. and fat 98 Gm., totaling 1,870 calories daily. The carbohydrate distribution was 37, 51, 16 (3 p. m.), 57, 0. The results obtained with globin (zinc) insulin are given in table 11.

CASE 15.—J. S., a woman aged 63, weighing 54.1 Kg., had had diabetes for eight years. She was convalescent following an amputation through the thigh for an infected foot. The former insulin dose was 12 units of crystalline plus 24 units of protamine zinc insulin daily, with good diabetic control. The diet during the study was carbohydrate 137 Gm., protein 60 Gm. and fat 72 Gm., totaling 1,436 calories daily. The carbohydrate distribution was 31, 42, 16 (3 p. m.), 48, 0. The results obtained with globin (zinc) insulin are given in table 12.

Clear Protamine Zinc Insulin: The results obtained with clear protamine zinc insulin in the 7 additional patients whose case summaries follow were in general the same as those observed earlier in the 4 special study patients. In some patients fairly good control of the

TABLE 12.—Results Obtained with Globin (Zinc) Insulin in Case 15

Date, 1941	Globin (Zinc) Insulin, Units	Blood Sugar, Mg. per 100 Cc.			Sugar in Urine, Gm. in 24 Hours
		Fasting	11 A. M.	4 P. M.	
August 16	30	...	...	...	0
18	30	154	182	115	0
26	30	103	83	112	0
September 2	30	81	78	...	0

diabetic condition was possible; in certain others the effect of the single dose given before breakfast seemed to last definitely less than twenty-four hours, so that high fasting blood sugar levels resulted. In such patients, near hypoglycemic values in the late afternoon, despite midafternoon lunches, precluded further increases in insulin dosage. The degree of diabetic control varied from patient to patient and in the same patient from day to day; it was not as even and pre-

dictable as with histone zinc or globin (zinc) insulin. The different results obtained with clear protamine zinc insulin as compared with those observed with globin (zinc) insulin are surprising and inexplicable in view of the almost identical response seen following single subcutaneous injections into fasting subjects, as shown in chart 6.

Despite these somewhat unfavorable results it is true that since 1937 we have maintained a small group of patients for varying periods of time (4 patients for one to three years) on clear protamine zinc insulin (U-100 strength) and have obtained good to excellent control of the diabetic condition. This experience has demonstrated that with certain patients this preparation is almost ideal. However, with the majority of patients the effect of a single dose daily does not allow as good or constant control as does histone zinc or globin (zinc) insulin. This is undoubtedly due in part to the some-

TABLE 17.—Results Obtained with Clear Protamine Zinc Insulin in Case 20

Date, 1941	Clear Protamine Zinc Insulin, Units	Blood Sugar, Mg. per 100 Cc.			Sugar in Urine, Gm. in 24 Hours
		Fasting	11 A. M.	4 P. M.	
September 3	56	200	...	115	21
4	56	253	241	180	28
6	60	57	220	180	23
8	60	80	64	...	3
9	56	163	165	74	21
11	56	106	131	62	..

TABLE 18.—Results Obtained with Clear Protamine Zinc Insulin in Case 21

Date, 1941	Clear Protamine Zinc Insulin, Units	Blood Sugar, Mg. per 100 Cc.			Sugar in Urine, Gm. in 24 Hours
		Fasting	11 A. M.	4 P. M.	
September 3	70	...	...	116	26
4	70	43	118	81	0
5	66	51	...	62	2
6	60	274	...	...	63
7	66	...	120	...	57
8	70	41	120	...	Trace
9	64	179	...	...	19
11	64	116	194	...	34
13	64	323	...	...	46
14	68	...	...	...	56
15	68	55	204	...	..

what shorter duration of action of clear protamine zinc insulin and it is possible that with injections twice daily a desirable method of treatment could be devised. However, in the interest of simplicity and convenience to the patient, we have concerned ourselves solely with the effect of single doses daily.

CASE 20.—T. P., a man aged 20, weighing 54.5 Kg., had had diabetes for ten months. No complications were present. The former insulin dose was 30, 0, 25 of crystalline insulin daily, with fair diabetic control. The diet during the study was carbohydrate 187 Gm., protein 95 Gm. and fat 106 Gm., totaling 2,082 calories daily. The carbohydrate distribution was 46, 54, 18 (3 p. m.), 69, 0. The results obtained with clear protamine zinc insulin are given in table 17.

CASE 21.—V. S., a girl aged 18 years, weighing 50 Kg., had had diabetes for fifteen years. She was convalescing from an infection of a toe. The former insulin dose was 16 units of crystalline and 56 units of turbid protamine zinc insulin daily, with good diabetic control. The diet during the study was carbohydrate 182 Gm., protein 86 Gm. and fat 84 Gm., totaling 1,828 calories daily. The carbohydrate distribution was 37, 62, 16 (3 p. m.), 67, 0. The results obtained with clear protamine zinc insulin are given in table 18.

SUMMARY

The results obtained in this investigation are here summarized. All statements made are based on results obtained with a single subcutaneous morning injection of insulin either before breakfast or at the beginning of a special test day during which food was withheld.

I. *Histone Zinc Insulin*.—1. Histone zinc insulin is a long acting insulin, effective for at least twenty-four hours. A single adequate dose before breakfast produces in almost all patients a normal fasting blood sugar value the following morning. In our patients glycosuria was well controlled.

2. During the first two hours following the injection of histone zinc insulin into a fasting diabetic subject there is a definite though moderate fall in blood sugar, due presumably to the presence of a small amount of soluble insulin in the preparation. This may well explain why there is but little rise in blood sugar between 7 a. m. and 11 a. m. (i. e. following breakfast) with this product. This initial action is well illustrated in chart 6.

3. The action of histone zinc insulin resembles closely that of turbid protamine zinc insulin except for the initial action just described and probably for a slightly less prolonged effect.

4. The tendency of the blood sugar level of patients receiving a single, adequate dose of histone zinc insulin daily before breakfast is to be normal fasting, to rise slightly from 7 to 11 a. m., to have a moderate rise between 11 a. m. and 2 p. m., then to fall moderately between 2 and 5 p. m., to rise slightly after supper from 5 to 10 p. m. and then to fall gradually throughout the night.

5. There were definitely fewer hypoglycemic reactions than with turbid protamine zinc insulin or with protamine zinc insulin and crystalline insulin combined. The few reactions observed were similar to those seen after administration of turbid protamine zinc insulin. There were only four reactions during the seventy-seven days that the 4 special study patients received histone zinc insulin. Two of them occurred between 5 and 6 a. m. and two occurred at approximately 11 a. m.

6. A bedtime lunch is advisable, as with turbid protamine zinc insulin, to prevent nocturnal hypoglycemia.

7. In our small series, histone zinc insulin has seemed especially valuable in the control of diabetes in children. S. K. and M. G., aged 11 months and 26 months respectively, were well controlled on histone zinc insulin.

8. No local cutaneous (allergic) reactions were noticed.

9. One definite disadvantage was discovered: The substance, especially that in the U-80 strength and from lots prepared some months before, tends to clump and to adhere to the neck of the vial. It is hoped that this difficulty can be overcome by the manufacturers.

10. For patients requiring doses of insulin larger than 30 to 40 units daily, a single injection of histone zinc insulin allows better control of the diabetic condition than does a single injection of the turbid protamine zinc variety. If doses of the latter type greater than 30 or 40 units daily are required, supplementary doses of crystalline insulin are often necessary.

II. *Globin (Zinc) Insulin*.—1. Globin (zinc) insulin is also a long acting insulin with a duration of effect somewhat shorter than that of histone zinc insulin or turbid protamine zinc insulin. However, its action appears to extend for approximately twenty-four hours and in adequate dosage this insulin usually allows a

normal fasting blood sugar level. Glycosuria was well controlled in all of our patients except 1 baby aged 21 months.

2. The initial action is not as great as with histone zinc insulin but a definite effect is evident within two hours after injection. Its subsequent rate of action lies between that of crystalline insulin and that of turbid protamine zinc insulin.

3. The tendency of the blood sugar following an adequate dose of globin (zinc) insulin is to be normal fasting, to have a moderate rise between 7 and 11 a. m., to rise very slightly or to fall slightly between 11 a. m. and 2 p. m., to fall rapidly between 2 and 5 p. m. if no midafternoon lunch is given and to fall only moderately if one is given, to continue to fall slightly between 5 and 10 p. m. and then to rise slightly from 10 p. m. to 7 a. m. the next morning. The moderate rise in blood sugar after breakfast may be lessened if the insulin is given as long as forty-five to sixty minutes before the meal.

4. There is a tendency to a large rapid fall in blood sugar between 2 and 5 p. m. unless a midafternoon lunch is given. The 2 special study patients who received a midafternoon feeding had a total of six insulin reactions in nineteen days while the 2 patients who received no midafternoon lunch had a total of twenty-three insulin reactions in thirty-seven days. Eighty-six per cent of these reactions occurred in the late afternoon or evening. The 7 additional patients treated with globin (zinc) insulin in the hospital and who received a midafternoon lunch had only two reactions in a total of one hundred and forty-one days. This would indicate that a midafternoon lunch can eliminate nearly all of the late afternoon and evening insulin reactions in patients taking this type of insulin.

5. A bedtime lunch is best omitted to avoid hyperglycemia during the night.

6. Our experience to date has not been extensive enough to comment on the statements of Duncan and Barnes¹⁰ and Andrews and Groat⁸ that in the same patient smaller doses of globin (zinc) insulin are required for comparable control of diabetes than when turbid protamine zinc insulin is used.

7. No local cutaneous (allergic) reactions were noticed.

8. The fact that this insulin is a stable, water-clear solution is an important advantage.

III. *Clear Protamine Zinc Insulin*.—1. Clear protamine zinc insulin is a long acting insulin whose duration of effect lies between crystalline insulin and turbid protamine zinc insulin, being apparently less than that of histone zinc or globin (zinc) insulin. It seems to last for about eighteen to twenty-four hours.

2. The blood sugar curves on the fast days, during which a small dose of this product was injected, were remarkably similar to curves obtained with globin (zinc) insulin under comparable conditions.

3. Despite this apparent similarity between clear protamine zinc insulin and globin (zinc) insulin on fast days, we found clear protamine zinc insulin a more difficult insulin with which to control the diabetic condition than globin (zinc) insulin. Glycosuria was only fairly well controlled with this insulin.

4. Following an adequate dose of this type of insulin, a moderately large rise in blood sugar occurred between 7 and 11 a. m. The values usually fell between 11 a. m. and 2 p. m. but rose moderately in 1 instance (D. F.). Between 2 and 5 p. m. there was a large fall in blood sugar if no midafternoon lunch was given

and a moderate fall if the lunch was taken. There was a slight rise between 5 and 10 p. m. and a further slight rise between 10 p. m. and 7 a. m.

5. If this insulin is given from forty-five to sixty minutes before breakfast, the rise in blood sugar after the meal may be lessened. A midafternoon feeding is indicated, as it is when globin (zinc) insulin is used, in order to prevent hypoglycemic reactions in the late afternoon. Three patients received this insulin without a midafternoon lunch for thirty-eight days, during which they had twelve insulin reactions. The 8 patients who had a midafternoon lunch were given this insulin for sixty-one days, during which ten insulin reactions occurred. One patient (P. D.) had seven, five in the first three days while taking this preparation, and obviously they were the result of too large a dose. A bedtime lunch should be omitted in order to lessen the tendency to hyperglycemia the following morning.

6. No local cutaneous (allergic) reactions occurred.

7. Like globin (zinc) insulin, this is a stable, clear preparation.

CONCLUSIONS

Histone zinc insulin, globin (zinc) insulin and clear protamine zinc insulin are all insulins with prolonged action, with duration of effect in the order named. The action of histone zinc insulin is longest, closely approximating that of turbid protamine zinc insulin. It differs from the latter in that (1) it has a slight blood sugar-lowering effect within two hours after injection and that (2) larger single doses may be given without producing late hypoglycemic reactions. It shares with market protamine zinc insulin the disadvantage of being a turbid suspension. Some difficulty has been encountered with clumping of particles of histone zinc insulin and adherence to the neck of the vial.

Globin (zinc) insulin is a water-clear solution, the action of which does not extend over as long a period as that of turbid protamine zinc insulin or quite as long as that of histone zinc insulin but in most patients an adequate daily dose before breakfast will allow a normal fasting blood sugar the following morning. On such a regimen the blood sugar level in the latter part of the afternoon is apt to be low and a reaction result, but these can be avoided by redistribution of carbohydrate to provide a small midafternoon lunch regularly. In our small group of patients no local (allergic) cutaneous responses were encountered either with globin (zinc) insulin or with histone zinc insulin.

Clear protamine zinc insulin, also a solution, produced a response in the blood sugar level of a fasting diabetic subject which closely resembled that of globin (zinc) insulin. The diabetic condition of certain patients has been well controlled over long periods of time with this preparation. However, in other patients we have been unable to control diabetes as easily and as effectively with a single morning injection of this insulin as with comparable injections of the histone zinc or globin (zinc) varieties. This is presumably due to the shorter action of the clear protamine zinc insulin.

We believe that histone zinc and globin (zinc) insulins are highly satisfactory products that can be used to control the diabetes of most patients. We are less sure of the value of clear protamine zinc insulin and believe that further clinical trial is necessary before reaching a final conclusion. With some patients, clear protamine zinc insulin is remarkably effective.

Every effort should be made to simplify rather than to complicate the treatment of diabetes. For this reason the number of insulins on the market should be kept to a minimum, preferably two: a rapidly acting and a slowly

acting type. The duration of action of the latter should be at least twenty-four hours. There is much evidence clinically to indicate that the overlapping action of the market turbid protamine zinc insulin, secured because of its duration of effect for more than twenty-four hours, is a distinct advantage since it is an added protection to the patient from acidosis.

We believe that, although in certain of their properties the newer types of insulin possess advantages over turbid protamine zinc insulin, these advantages are not great enough to justify complicating the treatment of diabetes by the introduction of these preparations on the market at the present time. Further work is in progress in an attempt to establish their value more definitely.

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THE ETIOLOGY OF DIABETIC ACIDOSIS

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CINCINNATI

Early in the history of the study of diabetic coma it became apparent that acidosis plays an important part in the production of this syndrome. Subsequently it was demonstrated that this state is due primarily to the accumulation of large amounts of organic acids in the tissues, particularly beta-hydroxybutyric and acetoacetic acids, and that the excretion of these, together with smaller amounts of other organic acids, results in a depletion of base. The loss of base causes a dehydration and intensifies the acidosis and a vicious cycle ensues. For some time minor controversies occurred with reference to the relative importance of the acidosis or the toxic effects of the acetone bodies themselves in the production of the coma. Today the physician is aware that both are important.

In view of the predominant role of the acetone bodies in the development of diabetic acidosis and coma it became of interest to determine the mechanism responsible for the formation and utilization of these acids. The observation that, in addition to diabetes mellitus, starvation and many other situations in which the carbohydrate reserves are depleted are also associated with acetonuria led to the assumption first promulgated by Hirschfeld¹ in 1895 that the acetone bodies are abnormal end products. This was subsequently epitomized by Rosenfeld² in the quotation "Fats burn only in the flames of carbohydrate." Knoop's³ studies on beta oxidation of fatty acids, Lusk's⁴ observations on the correlation between carbohydrate oxidation and the appearance of acetone bodies and Shaffer's⁵ demonstration that the oxidation of acetoacetic acid *in vitro* is catalyzed by the presence of dextrose lent credence to the hypothesis that the acetone bodies are incomplete products of fat oxidation.

It was assumed from these and other studies that for the complete oxidation of fatty acids the simulta-

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1. Hirschfeld, Felix: Beobachtungen über die Acetonurie und das Coma diabeticum, *Ztschr. f. klin. Med.* 28: 176, 1895.

2. Rosenfeld, G.: Fett- und Kohlenhydrate, Berlin. *Min. Wechnsch.* 42: 978, 1906.

3. Knoop, F.: Der Abbau aromatischer Fettsäuren im Tierkörper, *Beit. z. chem. Physiol. u. Path.* 6: 150, 1904.

4. Lusk, Graham: Elements of Science and Nutrition, ed. 4, Philadelphia, W. B. Saunders Company, 1923.

5. Shaffer, F. A.: Antiketogenesis: An *In Vitro* Analogy, *J. Biol. Chem.* 47: 433 (July) 1921.

neous oxidation of carbohydrate was essential and that when this did not occur, either because the tissues could not use carbohydrate or because carbohydrate was not available, the fatty acids were only partially oxidized in the tissues. Thus arose the concept of a quantitative relationship between the oxidation of carbohydrates and that of fats and resulted in the development of the so-called "ketogenic-antiketogenic ratio," which has been used so widely in clinical medicine. This hypothesis provided a basis for the assumption that ketone bodies are manufactured in all tissues of the body, that the diabetic organism cannot oxidize them and that the influence of carbohydrate and of insulin in decreasing the ketosis is due to a restitution or stimulation of acetone body oxidation by some carbohydrate product. This has been the prevailing point of view and is still accepted as such by the majority.

The first intimation that this concept is incorrect can be gathered from studies done in 1910 by Embden,⁶ who observed that the isolated liver was the only tissue capable of producing acetone bodies on perfusion with fatty acids. Another major contribution appeared in 1928 when Chaikoff and Soskin⁷ demonstrated that removal of the liver from the depancreatized dog results in a drop in the blood acetone bodies, thus implicating the liver as the site of acetone body formation in the intact animal. Studies by Quastel and Wheatley,⁸ Jowett and Quastel⁹ and Edson¹⁰ with the tissue slice technic favored the possibility that the liver was the site of acetone body formation. In 1936 we demonstrated that the ketosis consequent to the administration of extracts of the anterior pituitary gland was due to the formation of acetone bodies by the liver alone. Thus, whereas acetone bodies appear in the blood of normal animals treated with extract of anterior pituitary, this does not occur when the liver is removed.¹¹ Today it is generally accepted that the liver is the sole site of acetone body formation in the intact organism.

Much work has been done with regard to acetone body utilization by the peripheral tissues. In 1928 Snapper and Gruenbaum¹² demonstrated that perfused striated muscle of normal animals utilizes acetone bodies. The studies by Chaikoff and Soskin in the same year established that both normal and depancreatized dogs can oxidize acetone bodies. Later, Friedemann,¹³ also working with normal and depancreatized dogs, could demonstrate no influence of insulin on the normal rate of acetone body utilization by the muscles. Barnes and Drury,¹⁴ Dye and Chidsey¹⁵ as well as our group¹⁶ have presented evidence along similar lines. The more recent observations of Blixenkron-Moeller¹⁷ and of

Stadie¹⁸ on isolated tissues of normal and depancreatized cats confirm these observations.

Working with eviscerated and hepatectomized rabbits we¹⁹ could not demonstrate any influence of dextrose on the rate of the utilization of acetone bodies by the muscles of fed or fasting animals or of those treated with anterior pituitary. Increasing the rate of acetone body utilization by inducing hypermetabolism in similarly prepared animals likewise revealed no relation between sugar and acetone body utilization.²⁰ In spite of this evidence, many investigators still persisted in the belief that dextrose is ketolytic and that some correlation exists between the oxidation of dextrose and that of acetone bodies. Hence in 1938, together with Waters and Fletcher,²¹ some crucial experiments were performed on the heart-lung preparation in which the amount of dextrose and of acetone bodies in the blood perfusing the heart could be regulated. These experiments revealed that there is no correlation between the utilization of carbohydrate and the utilization of acetone bodies, since the ketogenic-antiketogenic ratios varied from zero to infinity. More recently, employing a technic which permitted the analysis of whole animals, we demonstrated again that sugar has no influence on the oxidation of acetone bodies.²²

The conclusion that can be drawn from these studies is that the utilization of acetone bodies by the peripheral muscles is not in any way affected by the availability of carbohydrate or of insulin. Yet insulin will alleviate the ketosis which occurs in the diabetic state and carbohydrate will do likewise to the ketosis which occurs in starvation. It is obvious, therefore, that they must produce their effect by acting on the site of acetone body production, namely the liver. That is, dextrose and insulin are not ketolytic but are antiketogenic in their action in that they prevent the formation of acetone bodies.

During the course of our studies we observed that the rate of acetone body utilization by the animal is the same irrespective of whether or not the liver is present, which suggests that this organ does not burn the acetone bodies to any appreciable extent. Thus, although the acetone bodies are made in the liver, they are not used there but are secreted immediately into the blood stream. This conclusion is in accord with the studies of Quastel and Wheatley,⁸ of Snapper and Gruenbaum,²³ of Edson,¹⁰ and of others working with isolated liver slices, which indicated that the acetone bodies are not abnormal products of incomplete fat oxidation but perfectly normal end products of fat metabolism in the liver. More recently, Stadie and his collaborators have confirmed these conclusions from their observations on isolated tissue slices.²⁴

6 Embden, G., and Wirth, J. Ueber Hemmung der Acetessigsäurebildung in der Leber, *Biochem. Ztschr.* **27**:1, 1910.

7 Chaikoff, I. L., and Soskin, Samuel. Utilization of Acetoacetic Acid by Normal and Diabetic Dogs Before and After Evisceration, *Am. J. Physiol.* **87**:58 (Nov.) 1928.

8 Quastel, J. H., and Wheatley, A. H. M. Oxidation of Fatty Acids in Liver, *Biochem. J.* **27**:1753, 1933.

9 Jowett, Maurice, and Quastel, J. H. Studies in Fat Metabolism. Oxidation of Butyric, Crotonic, and β -Hydroxybutyric Acids in Presence of Guinea Pig Liver Slices, *Biochem. J.* **29**:2143 (Sept.) 1935.

10 Edson, N. L. Ketogenesis Antiketogenesis, Substrate Competition in Liver, *Biochem. J.* **30**:1862 (Oct.) 1936.

11 Mirsky, I. A. The Site and Mechanism of the Antiketogenic Action of Insulin, *Am. J. Physiol.* **116**:222 (July) 1936. Mirsky.¹⁹

12 Snapper, I., and Gruenbaum, A. Ueber den Abbau von Diacetsäure und β -Oxybuttersäure in den Muskeln, *Biochem. Ztschr.* **201**:464, 1928.

13 Friedemann, T. E. Metabolism of Sodium Acetoacetate Intravenously Injected into Dogs, *J. Biol. Chem.* **116**:133 (Nov.) 1936.

14 Barnes, R. H., and Drury, D. R. Utilization of Ketone Bodies by Tissues in Ketosis, *Proc. Soc. Exper. Biol. & Med.* **36**:350 (April) 1937.

15 Dye, J. A., and Chidsey, Janet L. Total Carbohydrate Acetone Body Utilization Rates with High Acetone Body Concentrations, *Am. J. Physiol.* **126**:P482 (July) 1939.

16 Mirsky, I. A., and Broth Kahn, (footnotes 19 and 20).

17 Blixenkron-Moeller, N. Kohlenhydrat- und Ketonkörperbildung aus Fettsäuren in der künstlich durchströmten Katzenleber, *Ztschr. f. physiol. Chem.* **252**:137, 1938.

18 Stadie, W. C., Zapp, J. A., and Lukens, F. D. W.: Effect of Insulin upon Ketone Metabolism of Normal and Diabetic Cats, *J. Biol. Chem.* **132**:423 (Jan.) 1940.

19 Mirsky, I. A. The Source of the Blood Acetone Resulting from the Administration of the Ketogenic Principle of the Anterior Hypophysis, *Am. J. Physiol.* **115**:424 (April) 1936. Mirsky, I. A., and Broth Kahn, R. H. The Influence of Dextrose Administration on the Utilization of Beta-Hydroxybutyric Acid by the Normal and Eviscerated Rabbit, *ibid.* **119**:734 (Aug.) 1937.

20 Mirsky, I. A., and Broth Kahn, R. H. The Influence of Increased Metabolism on Beta-Hydroxybutyric Acid Utilization, *Am. J. Physiol.* **120**:446 (Nov.) 1937.

21 Waters, E. T.; Fletcher, J. P., and Mirsky, I. A. The Relation Between Carbohydrate and Beta-Hydroxybutyric Acid Utilization by the Heart Lung Preparation, *Am. J. Physiol.* **122**:542 (May) 1938.

22 Mirsky, I. A.; Nelson, Norton, and Grayman, Isabelle. The Utilization of Acetone Bodies. I. The Influence of Feeding and of Glucose in Nephrectomized Female Rats, *J. Biol. Chem.* **130**:179 (Sept.) 1939. Grayman, Isabelle; Nelson, Norton, and Mirsky, I. A. The Utilization of Acetone Bodies. II. The Influence of Sex, *ibid.* **131**:121 (Nov.) 1939.

23 Snapper, I., and Gruenbaum, A.: Ueber den Abbau der Diacetsäure in der Niere, *Biochem. Ztschr.* **185**:221, 1927.

24 Stadie, W. C. Fat Metabolism in Diabetes Mellitus, *J. Clin. Investigation* **19**:843 (Nov.) 1940. Stadie, Zapp and Lukens.¹⁸

In order to present a working hypothesis in explanation of these phenomena it was suggested that a diminution in liver glycogen is the essential prerequisite for an increase in fatty acid oxidation, resulting in an accelerated rate of acetone body formation in the liver and a consequent acetonemia. The fact that insulin induces the retention of glycogen in the liver, while the administration of dextrose stimulates the synthesis of glycogen, adequately explains their antiketogenic actions. By making glycogen available to the liver, the oxidation of fat in this organ is arrested and hence the secretion of acetone bodies into the blood stream ceases.²⁵ The mechanism whereby depletion of glycogen in the liver induces oxidation of fat in that organ may be referable to the concept that both glycogen and fat compete for the same enzyme system.¹⁰ This enzyme system may have a greater affinity for glycogen, which might explain why it is not available for the oxidation of fat when glycogen is present in adequate amounts. When the glycogen concentration is depleted, the enzyme becomes available for the oxidation of fatty acids.

It is generally acknowledged that the liver of the diabetic organism is poor in glycogen because the rate of the breakdown of glycogen is excessive and that ketogenesis occurs when the glycogen content falls below some critical low level.²⁵ Accordingly, if it were possible to produce an accumulation of glycogen, even in the absence of insulin, ketosis should cease. Experiments performed by Mann, Bodo and their collaborators²⁶ revealed that the liver and muscles of the untreated depancreatized dog can make glycogen when treated with adequate amounts of dextrose. This led us to postulate that such treatment should also result in a cessation of acetone body formation. We were able to demonstrate that the intravenous administration of large amounts of dextrose to the depancreatized dog receiving no insulin results in a rapid drop in the concentration of acetone bodies of the blood and urine. When the administration of dextrose is stopped, the acetone bodies again accumulate in the blood.²⁷ In other words, dextrose can inhibit the formation of acetone bodies even in the absence of insulin if it is administered in amounts adequate for glycogen deposition in the liver.

Conversely, one would anticipate that wherever there is an impoverishment of the liver with respect to glycogen, the susceptibility to ketosis and therefore to diabetic coma would be increased. For example, it is a generally recognized fact that the young child does not retain glycogen as readily as does the adult. Hence it was not surprising to find that in both normal and diabetic children a definite correlation exists between the age of the child and its susceptibility to the ketosis induced by a glycogenolytic stimulus.²⁸ Likewise, in adult diabetic patients in whom it is known that the glycogen concentration in the liver is relatively low, a stimulus which will cause a further decrease of glycogen will produce ketosis, while in the normal subject the same stimulus is ineffective.²⁸ These facts all indicate that, instead of facilitating fat oxidation, dextrose actu-

ally inhibits it. In other words, dextrose exerts a fat-sparing action²⁹ just as it is known to exert a nitrogen sparing action.

The question might logically be raised at this point, since acetone bodies are normal intermediaries of fat oxidation and are utilized freely in normal and diabetic muscle. Why does an excessive accumulation of these substances in the blood stream ever occur? The probable answer is that there is a maximum rate at which muscles can utilize acetone bodies, just as there is a maximum rate at which muscles can utilize sugar. Recent studies by our group³⁰ and by Drury and Wick³¹ reveal that there is a positive correlation between the concentration of acetone bodies in the tissues and their utilization up to a certain maximum rate (approximately 7 millimols per kilogram of body weight per hour), beyond which utilization is not increased. Therefore, if the rate of fatty acid oxidation and hence the rate of acetone body formation in the liver exceeds the rate at which the muscles use the acetone bodies, ketosis and consequently acidosis will ensue.

Attempts to produce diabetic coma in the experimental animal generally have not met with success. The completely depancreatized dog deprived of insulin and food does not develop the typical syndrome observed in man but appears to die in a somewhat cachectic state. The ketonemia that occurs in such an animal rarely approaches levels comparable to that observed in man. In the cat, a more severe ketonemia may follow the withdrawal of insulin and food, but here too the syndrome is not the same as that in man. However, severe diabetic acidosis and coma can be produced in the completely depancreatized dog by withdrawal of insulin and food plus the administration of a single dose of phlorhizin. This drug decreases the reabsorption of sugar in the kidney tubules and thereby induces an excretion of large amounts of dextrose. This results in a drainage of sugar from the blood, which in turn induces an increase in the breakdown of liver glycogen. Thus by further depletion of glycogen in the liver of the depancreatized dog it is possible to force ketogenesis to such a degree as to result in the accumulation of large amounts of acetone bodies.²⁹

During the past year we have been studying the diabetic syndrome of the depancreatized monkey. Studies in the past indicated that severe diabetes does not develop in the depancreatized monkey; in fact, such animals have been compared with the hypophysectomized-depancreatized dog in which the diabetes is known to be mild. Nevertheless, we have succeeded in producing acidosis in the depancreatized monkey at will. If the monkey, several weeks after pancreatectomy, is deprived of insulin but is permitted to eat food freely, severe acetonemia does not develop. However, if food is also removed, the ketosis is exaggerated and acidosis ensues. Thus, within seventy-two hours after the cessation of insulin and the beginning of a fasting period, 1 monkey was in coma with an acetonemia of 175 mg. per hundred cubic centimeters. This monkey presented the typical picture of diabetic coma as observed in man, i. e. unconsciousness, dehydration.

25. Mirsky, I. A.: Some Theoretical Considerations of Diabetes Mellitus, *J. Medicine* **18**: 222 (July) 1937.

26. Major, S. G., and Mann, F. C.: Formation of Glycogen Following Pancreatectomy, *Am. J. Physiol.* **102**: 409 (Nov.) 1932. Bodo, R. C.; CoTul, F. W., and Farber, L.: Liver Glycogen Storage in Diabetic Animals, *ibid.* **103**: 18 (Jan.) 1933.

27. Mirsky, I. A.; Heiman, J. D., and Broh-Kahn, R. H.: The Antiketogenic Action of Glucose in the Absence of Insulin, *Am. J. Physiol.* **118**: 290 (Feb.) 1937.

28. Mirsky, I. A.; Korenberg, Morton, Nelson, Norton, and Nelson, W. E.: The Hepatic Glycogen Reserves in Diabetes Mellitus, *Endocrinology* **28**: 358 (March) 1941.

29. Mirsky, I. A., and Senior, F. A.: The "Fat Sparing" Action of Glucose in the Absence of Insulin, *Proc. Soc. Exper. Biol. & Med.* **37**: 505 (May) 1937.

30. Nelson, Norton; Grayman, Isabelle, and Mirsky, I. A.: The Utilization of Acetone Bodies. IV. The Relation Between Concentration and the Rate of β -Hydroxybutyric Acid Utilization by the Rat, *J. Biol. Chem.* **140**: 361 (Aug.) 1941.

31. Wick, A. N., and Drury, D. R.: Effect of Concentration on Rate of Utilization of Beta-Hydroxybutyric Acid by Rabbit, *J. Biol. Chem.* **138**: 129 (March) 1941.

Kussmaul breathing, tarry vomitus and signs and symptoms of peripheral collapse. Incidentally, it was noted that, just as in man, if insulin is not administered sufficiently early to the unconscious monkey recovery does not occur.³²

It appears, thus, that, so long as the monkey can take in enough food to provide an adequate storage of glycogen in the liver, the rate of fat metabolism and hence the rate of acetone body formation cannot become sufficiently accelerated to cause an excessive acetonemia, even in the absence of insulin.

Of the many possible factors that have been postulated as being responsible for the development of diabetic acidosis and coma in man, emphasis has been placed on (1) deprivation of insulin, (2) infection and (3) dietary indiscretion. Observations on both man and lower species indicate conclusively that deprivation of insulin is a major factor in the production of ketosis because in its absence retention of glycogen in the liver is impaired and hence oxidation of fat goes on at an accelerated rate. However, in some lower species and even in some diabetic patients, if enough carbohydrate is provided for retention as glycogen in the liver, some decrease in the rate of oxidation of fat can be produced even in the absence of insulin.

In a study of insulin deprivation in human diabetes we³³ found that in one group of patients acetonemia and increasing hyperglycemia developed rapidly and culminated in acidosis and precoma within twenty-four hours, while in the second group a significant acidosis did not develop even after one week. When, in addition to insulin deprivation, carbohydrate in large amounts was administered, two types of responses were again observed. In the first group with the "explosive" type of response, irrespective of how large the amount of carbohydrate ingested, the removal of exogenous insulin still resulted in the rapid development of acidosis. In the second group of patients the slowly developing acetonuria could be prevented by the administration of large amounts of carbohydrate.

The clinical association of diabetic acidosis and coma with the presence of infection is beyond dispute. It may not be difficult to account for this correlation, for it has been demonstrated that the infected animal does not form glycogen from lactic acid as readily as does the normal animal,³⁴ and that infection increases the breakdown of liver glycogen.³⁵ Both of these phenomena result in a decrease in the amount of glycogen available in the liver, which in turn induces an increase in the breakdown of fat and protein. Therefore, when the diabetic patient has an infection, what little glycogen reserves are present in the liver become further diminished, and ketosis and acidosis ensue. This can be demonstrated vividly by administering phlorhizin to a diabetic patient suffering from a nonspecific infection. The glycosuria that ensues causes a decrease in liver glycogen and ketosis follows. A similar loss of sugar from a normal subject does not induce ketosis.

With respect to dietary indiscretion, many authors state unequivocally that the ingestion of excessive amounts of carbohydrate is an important factor in "breaking the control" of the diabetic patient and in

the development of acidosis. This concept dates back a long time and still has many supporters. The certainty with which opinions are expressed concerning the dangers of a high carbohydrate intake for the diabetic patient is somewhat surprising in view of the fact that this assumption was not put to a test on an experimental basis until recently. We studied a group of patients ranging in age from 15 to 67 years. After their insulin requirements were established and the patients were under good clinical control various regimens were instituted. In some cases the insulin dosage was reduced to a level which would just prevent the development of signs and symptoms of acidosis. Other cases were studied in the complete absence of exogenous insulin. In all cases the fat and protein content of the diet was maintained at a constant level throughout the observations, while the carbohydrate content was increased to the limits of the subject's ability to consume it, which varied from 550 to 1,300 Gm. of carbohydrate a day. It was observed that under these conditions, except for the patients mentioned with the "explosive" response to deprivation of insulin, increasing carbohydrate ingestion resulted in increasing carbohydrate retention. It was noted also that in such cases the acetonuria diminished even though the blood sugar and glycosuria showed a pronounced increase.³³

Our data as to the effect of an excessive intake of carbohydrate definitely contradict the belief that it is an etiologic factor in the development of acidosis in the diabetic patient. In no instance among more than 30 patients studied was ketogenesis stimulated by excessive carbohydrate intake; on the contrary, an inhibition of ketogenesis was frequently observed. The only factor that invariably accelerated the production of acetone bodies was the withdrawal of exogenous insulin, and even under these circumstances some subjects showed an inhibition of acetone body production when put on an excessive carbohydrate intake. The observation that the higher the carbohydrate intake the greater the amount retained and, consequently, utilized is of significance in the light of the modern tendency to increase the carbohydrate content of the diets of diabetic patients.³⁶

These studies indicated also that the sudden development of an excessive blood sugar level in consequence of an excessive carbohydrate intake does not precipitate or even facilitate acidosis or coma, and from that point of view hyperglycemia is not dangerous. In fact our observations suggest that, once the minimal insulin requirements are established, increasing increments of carbohydrate intake, and the consequent hyperglycemia, result in increasing retention of carbohydrate for oxidation and storage, with a consequent diminution of the production of acetone bodies. It must be emphasized that a distinction should be made between hyperglycemia due to a high carbohydrate intake and that due to endogenous sources. In the former, the high blood sugar merely reflects the character of the diet and indicates that an increased amount of substrate is available for deposition in the liver; in the latter, the hyperglycemia represents a disturbance of regulation of such a degree that formation of dextrose and breakdown of glycogen are accelerated. Needless to say, excessive amounts of carbohydrate, such as we used, are contraindicated as a therapeutic procedure because of the

32. Mirsky, I. A.; Nelson, Norton, and Elgart, Samuel: Diabetic Acidosis and Coma in the Monkey, *Science* 93: 576, 1941.

33. Mirsky, I. A.; Franzblau, A. N.; Nelson, Norton, and Nelson, W. E.: The Role of Excessive Carbohydrate Intake in the Etiology of Diabetic Coma, *J. Clin. Endocrin.* 1: 307 (April) 1941.

34. Holmes, Eric: Effect of Toxemia on Metabolism, *Physiol. Rev.* 19: 439 (Oct.) 1939.

35. Soskin, Samuel, and Mirsky, I. A.: Influence of Progressive Toxic Liver Damage upon Dextrose Tolerance Curve, *Am. J. Physiol.* 112: 649 (Aug.) 1935.

36. Tolstoi, Edward, and Weber, F. C., Jr.: Protamine Zinc Insulin: Metabolic Study; Treatment in Two Cases of Severe Diabetes by Equally and Unequally Divided Diet, with Comments on Criteria for Treatment, *Arch. Int. Med.* 64: 91 (July) 1939.

polyuria and resultant loss of weight on the one hand and the possible danger of pancreatic exhaustion on the other.

CONCLUSION

It may be stated that the most important cause of the development of diabetic ketosis and hence of the consequent acidosis and coma is the impoverishment of the liver with respect to glycogen. It is obvious from the data that excessive carbohydrate intake does not produce such an effect, whereas deprivation of insulin does do so. Similarly, any other phenomenon which will accelerate the depletion of glycogen in the liver, such as hyperthyroidism, hyperpituitarism, hepatitis, infection, surgical procedures, gastrointestinal disturbances, vomiting and so on will result in a secondary acceleration of oxidation of fat and the consequent secretion of acetone bodies into the blood stream in excessive amounts.

AVOIDANCE OF DEGENERATIVE LESIONS IN DIABETES MELLITUS

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Maintenance of life is not sufficient in itself as a goal in the treatment of diabetes mellitus. Insulin has made it easy for the patient with diabetes to survive. Therapy with insulin has such a broad zone of safety that its use tends to encourage a policy of *laissez faire* on the part of the patient and of the physician. Degenerative changes frequently develop in the diabetic patient who has been led to think that the management of his disease has been adequate. Because of this fact, confusion has arisen as to the essential cause of the sequelae of diabetes mellitus; are they inherent in the disease itself or do they reflect inadequacies in the level of control maintained throughout short or long intervals of the diabetic patient's life?

To make an adequate appraisal of the part played by the disease itself as distinguished from conditions imposed by its noncontrol, it is necessary that test subjects live under a regimen which is as free from unphysiologic conditions as circumstances will permit. One must bear in mind that impaired handling of sugar in the diabetic subject leads to certain perversions of the composition of body fluids, only one of which is the elevation of the level of dextrose in the blood and resultant glycosuria. A physiologic level of control is one which would avoid any degree of hyperglycemia, hypoglycemia or glycosuria and which would conserve the sugar handling function in maximal degree. Presumably if one could accomplish this, all conceivable disturbances of the body due to diabetes would be avoided. Through suitable control of the diet and the proper administration of insulin one can work toward an approximation of that state. Ideal control must be quantitatively as well as qualitatively adequate in

all regards if it is to serve its designed purpose. This implies not only that the diet must be adapted to the control of the diabetic state but also that it must be fully adequate for optimum nutrition if a physiologic status is to be our goal. Further, the regimen of management must be dynamic; it must be subject to continued reevaluation and adjustment and must be projected into the patient's future life so that lapses in control will not occur. When dealing with the child subject, the state of childhood must be kept in mind and the special problems imposed by childhood must be met suitably through the course of management. To make all these things possible, one must have the continued and unremittent cooperation of the patient, members of his household and those in his community who in any way are concerned with his pattern of life. Adequate physical and financial facilities must be assured for the maintenance of the prescribed regimen.

No one cognizant with the problems of diabetic care will question the desirability of any of the requisites specified, yet all will realize the unlikelihood that they will be met or even approached by the great majority of patients. Even under the best of auspices, diabetic control will fall considerably short of that outlined and of that which the physician would recommend. In patients following the most exacting regimen, periods of excellent control frequently will be interspersed with others characterized by inadequacy. For long intervals patients may seem none the worse for poor control. Even though they may not appear to suffer from the compromise level of management which they have adopted, this does not justify any one in concluding that they are not being affected adversely by the inadequacies of that compromise as compared with a more physiologic level of control. The effects of poor control of diabetes are cumulative and terminate in serious complications or sequelae which lead to impaired function or to death.

In studying the factors which lead to the development of degenerative changes in the diabetic patient, there are advantages in using the child with diabetes as a test subject. Conclusions derived from the child's condition will be applicable to the adult, because the pattern of the metabolic disturbance is not conditioned by the age of the subject. Moreover, confusion may be avoided in view of the fact that the child does not usually exhibit the degenerative changes which are commonplace during the period of postmaturity. Furthermore, the exaggerated response of the child's organism to abnormal metabolic conditions makes it easier to detect adverse states with him than with the adult subject. In the diabetic child one may be justified in concluding that abnormalities of function or of structure which arise must be related to his regimen of living, to his disease or to the interplay between the two.

When studying the child in this connection one must bear in mind that disturbances of growth or of development represent an analogue to strictly degenerative conditions in the mature patient and must be given the same significance in the analysis. Also some degenerative conditions will occur less frequently in the child than in the adult, notably those affecting the vascular system, possibly because of the greater resistance of young tissue to insult. Nevertheless it seems logical to assume that conditions found to favor the development or the prevention of degenerative states in the child will operate similarly for the adult patient.

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We have had an unusual opportunity to observe the course of the diabetic child under conditions which approximate the ideal as pictured in the foregoing discussion.¹ During the past fifteen years approximately 250 children with diabetes mellitus have been under care of the department of pediatrics. About 150 of them are under recurrent supervision at all times, with several of them in residence in the hospital wards. They are given consideration primarily as children, with measures designed for their normal development and maturation. Practically without exception these patients are medically indigent, committed to the hospital as wards of the state. They may be kept in the hospital as long as their condition makes it desirable or while studies concerning their problems are under way. They may be returned to the hospital for reappraisal or for readmission as often as the staff desires or as occasion requires. Both in the hospital and at home the medical staff retains the initiative; an aggressive policy of control of the disease is maintained, which patients and their parents accept and tend to follow. Through individualized services of medical social workers, local relief and other agencies and the medical staff, facilities for continued home care are assured. Each child is examined and treated at the hospital several times a year as long as his family and the local community choose to continue to use our services. In addition to receiving the usual detailed medical and laboratory examinations each time he returns to the hospital, the diabetic child also is seen in consultation with the ophthalmologist, the otolaryngologist, the pedodontist and the roentgenologist. From the cumulative records the reaction of the patient to his therapeutic regimen and his faithfulness in following it can be projected accurately through his whole period of supervision. Recently facilities have been made available for us to call back to the hospital certain young adult patients who previously were under our care, so that their present status can be evaluated. This report is based on the records of over 250 different children with diabetes mellitus who have been treated in our wards for varying intervals during the past seventeen years.

A total of 69 patients are considered in this review, chosen either because of the prolonged duration of their diabetes or because they presented degenerative lesions or related conditions. Of these 69, 60 had been recognizedly diabetic for five years or longer, and 42 of them had had the disease for not less than ten years. Fifty of the group have been under intermittent observation in our clinic for five years or longer, and 32 of them for not less than ten years. The remaining 19 have been observed over intervals varying from single hospital admissions to periods approximating five years. The same principles of diabetic control were prescribed for all subjects, but the manner and degree of cooperation differed widely within the group. Even with those whose records are among the best, several have had single or repeated intervals of noncontrol. In general the freedom from degenerative changes has paralleled the excellence and continuity of good diabetic control.

The survey has been directed toward the incidence of abnormalities of growth, physique or maturation, and

toward the occurrence of degenerative lesions of the liver, vascular system, eyes and teeth. Incidence of these abnormalities has been correlated with the duration of the disease, the nature and continuity of treatment and the cooperation of the subject.

Twenty-eight children showed anomalies related to growth at some time during the course of observation. For example, 17 were of substandard height when first seen in our clinic. Each had been recognizedly diabetic for a significant period at that time, the average duration of the disease in the 17 being three and one-half years at the time of the initial examination. All but 4 of this group grew at a normal rate once the therapeutic regimen had been established. Three of the exceptions failed to follow the prescribed course for any appreciable time. The fourth child had been abnormally small from early infancy, long before she became diabetic, and offered several evidences of pituitary disease. Of the children who were initially small but who subsequently grew at a rate which equaled or surpassed that which is standard for their ages, few were able to overcome their handicap completely and remained smaller than standard throughout their period of observation.

Twelve children in the whole series were so short at their terminal observation that they properly might be termed diabetic dwarfs. Six of these were among those who initially were small; the remainder were subjects who remained in a state of poor control for long periods of time. No child whose management had been even fair for the majority of his period of observation could properly be considered as a dwarf or even as abnormally short. We have had no reason to question the rule that the child whose diabetes is properly controlled and who receives an adequate diet will grow as well as the normal child. When inadequate growth is encountered, fault in the diet or in the manner of control must be assumed and disproved before the diabetes in itself or other endocrine abnormality can properly be postulated as causative.²

Eleven subjects were slow in maturation, as evidenced by delay in the development of secondary sex characteristics or the establishment of menstruation. All but 2 of these children also had shown retardation of growth; these 2 were in the second decade when their diabetes became manifest. All children who were slow in maturation were under poor levels of control most of the time. All but 1 reached maturity eventually; the exception was the child with associated pituitary disease. No child who was properly controlled showed delay in maturation.

Disturbances of growth and of maturation, then, seem to reflect prolonged periods of uncontrolled or of inadequately controlled diabetes in these subjects. Shorter periods of noncontrol, however, appear sufficient to produce regional abnormalities. Consideration now will be given to some of these conditions.

Enlargement of the liver was noted in 6 children as an accompaniment of other abnormalities. All were girls, each had been diabetic for several years and each showed impairment of growth and delayed maturation. In each instance the patient was brought back to a proper state of diabetic control some time after hepatomegaly had become apparent, and in each subject the enlargement of the liver subsided coincidentally with

1. Boyd, J. D., and Jackson, R. L.: Levels of Control in the Treatment of Diabetes Mellitus, *J. A. M. A.* **111**:906 (Sept. 3) 1938.
Jackson, R. L.; Boyd, J. D., and Smith, Thelma E.: Stabilization of the Diabetic Child, *Am. J. Dis. Child.* **59**:332 (Feb.) 1940.

2. Boyd, J. D., and Kantrow, A. H.: Retardation of Growth in Diabetic Children, *Am. J. Dis. Child.* **55**:460 (March) 1938.

this. Subsequently, however, management again was allowed to lapse by each of these subjects. At least 3 of the group also developed ocular degenerative lesions. Four of them showed excessive amounts of dental caries.

Two methods of appraisal of the vascular system were available from the routine of examination. The first of these, roentgenograms of the soft tissues of the wrists or ankles, revealed no evidence of arteriosclerosis in any subject. The other, the ophthalmoscopic examination, offered evidence of arterial disease in only 1 subject. This was a girl who was 20 years old when first seen by us. She had had diabetes for eighteen years of her life and throughout that time had never been adequately controlled. Her physical abnormalities included dwarfism, infantilism, albuminuric retinitis with bilateral choked disks, retinal hemorrhages, hypertension, uremia and posterior subcapsular lens opacities.

A second subject who returned to the hospital after several years of noncontrol had rather similar findings, including dwarfism, enlarged liver, infantilism, retinal hemorrhages and edema of the right nerve head (choked disk). Following six months of fairly rigorous control the disk had returned to a normal appearance, the hemorrhages had been reabsorbed and the liver enlargement had subsided. Even though her subsequent control left much to be desired, she went on to maturation, married and was delivered of a normal baby.

Six subjects showed retinal hemorrhages, coincident with variable periods of poor control. In some instances these periods were of only a few months duration. In 1 subject they were recurrent. In general they tended to subside and to disappear with the resumption of suitable control.

Clinically demonstrable diabetic cataracts were observed in 6 children. In each instance they were noted at the initial examination in our clinic. All were subjects in the second decade of life, each of whom had developed clinical diabetes not more than two years prior to the appearance of the cataracts and who had remained in a state of noncontrolled diabetes during that time.

In addition to these obvious opacities of the lens, posterior subcapsular opacities of minor degree were discovered in almost a third of the members of the series. These lesions were detectable only through the use of the slit lamp and the biomicroscope and would not have been discovered with any other form of examination. In each instance their appearance was coincident with a period of noncontrol of the diabetes or followed immediately after it.³ They are the precursors of the clinically apparent opacity and will terminate as such unless their course is checked. In each instance, however, the announcement of their presence to the patient and his parents and an explanation as to their significance and course led to the resumption of desirable levels of control. Thereafter there was no further increase in lens opacities in these subjects, and their eyes today remain free from functional handicap. Similar lesions have not been found in the eyes of those children whose management has been maintained at a satisfactory level.

In our whole series of children with diabetes mellitus, the rate of progression of tooth decay has been about a fourth as rapid as in the general child population of corresponding age.⁴ The dentin at the base of caries

initially present tended to become sclerotic and to remain so without further advance of decay as long as the dietary regimen was followed in its entirety and the diabetes remained fairly well under control. Other studies made with nondiabetic children indicate that such arrest of caries is dependent on the establishment and maintenance of optimal nutritional and metabolic status.⁵ In contrast with the group as a whole, the subjects who failed to follow the specified dietary regimen showed advance of caries even though their diabetic status seemed fairly well controlled. Among those children whose control was the poorest and who presumably were as lax in following the prescribed diet as they were in controlling glycosuria, the incidence and rate of advance of caries were increased notably. In some subjects caries advanced rapidly for periods of a few months coincidentally with relaxation of control and then became stationary and inactive with resumption of proper management. In general, those who showed persistent and excessive advance of caries also offered other evidences of degenerative conditions or retardation of growth.

SUMMARY

We have concluded from our study of diabetic children that adequately controlled diabetes mellitus does not predispose the child to degenerative diseases or to disturbance of growth. The children who have presented such abnormalities have shown concomitantly prolonged glycosuria with accompanying perversions of their normal physiologic state. The inadequacy of the regimen in these subjects could not have been established through their freedom from outstanding symptoms or from early physical signs of abnormality. If we were to have waited to verify the adequacy of management until physical signs had become apparent, irreparable damage frequently would have resulted. The evidence presented supports the premise that degenerative sequelae of diabetes mellitus represent late results of compromise levels of diabetic control, that they can be anticipated in the patient whose regimen of diabetic control or of diet falls appreciably short of physiologic levels, and that they can be prevented through the maintenance of suitable standards of management.

5. Boyd, J. D.; Drain, C. L., and Stearns, Genevieve: *J. Biol. Chem.* 103: 327 (Dec.) 1933; *Proc. Soc. Exper. Biol. & Med.* 30: 645 (June) 1937.

Nutrition in War Time.—Overcooking and twice cooking should be avoided as far as possible. Take as an example the effect of heat on cabbage. In the raw state 1 ounce of cabbage per day will protect an adult from scurvy. If the cabbage is boiled for twenty minutes 4 ounces will be required to protect from scurvy, if it is boiled for one hour 10 ounces will be required. If it is boiled with soda for only a short time it will be valueless as a protective against scurvy. Jam, which is made with long heating and stirring of fruits, contains no vitamin C. Marmalade is made from oranges, a fruit which normally contains a large amount of this vitamin, but as a result of the long cooking which it receives its vitamin C content is negligible. Cooking meat or potatoes or other vegetables twice usually destroys all traces of even the more heat stable vitamins, such as vitamin B₁. The water in which vegetables have been boiled should not be wasted because it contains many of the mineral salts of the vegetable; it should be made into a soup, preferably a thick one, with peas, beans, lentils or potatoes; alternatively, it could be made into a gravy and used to pour over meat. —Bourne, Geoffrey: *Nutrition and the War*, Cambridge University Press, 1940.

3. O'Brien, C. S., and Allen, J. H.: *Diabetic Children*, Unpublished data.
4. Boyd, J. D.: *J. Am. Dent. A.* 27: 750 (May) 1940.

IS ADMINISTRATION OF VITAMIN K TO THE NEWBORN OF CLINICAL VALUE?

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Quick¹ in 1937 described a method for the estimation of the prothrombin content of the blood that eliminated both thromboplastin and calcium as unknown factors. In 1939 Owen, Hoffman, Ziffren and Smith² reported that the prothrombin content of the blood of the newborn was reduced during the first ten days of life as estimated by a method of their own as well as by Quick's method. As we were studying the blood in the newborn at this time, it was decided to include prothrombin estimations in these observations and also to record any clinical manifestations of hemorrhage that might occur during the newborn period. This study was begun in May 1939. Six months later vitamin K was administered to certain of our newborn group and these observations were continued until May 1941.

PROCEDURE

The control group of normal newborn babies included 627 completely breast fed babies, or 64 per cent, and 355 artificially or partially breast fed babies, or 36 per cent, a total of 982 newborn babies. The group given vitamin K included 539 breast fed babies, or 76 per cent, and 172 artificially and partially breast fed babies, or 24 per cent, a total of 711 newborn babies. These babies were given daily examinations, and any hemorrhagic manifestations were recorded.

Vitamin K was given as soon as the infant reached the nursery. For the first six months of the study 1,000 units of the natural vitamin was given in oil. This was changed to the synthetic form because of ease in administration. The 1 mg. tablet was dissolved in 1 teaspoon of water and given with a medicine dropper. Occasionally a newborn baby would regurgitate the medication. For this reason the infant was observed for half an hour after the vitamin K was given and if regurgitation occurred the amount of 1 mg. was repeated. In 42 of the infants in this group 2 mg. of synthetic vitamin K was given to the mother before the birth of the child. This was given at least five hours before delivery and in such instances none was given to the infant.

In the prothrombin studies, blood was withdrawn from the mother at the time of delivery and from the cord immediately after the birth of the infant. Blood was withdrawn from the baby daily thereafter. These determinations were made on the same baby for consecutive days. No baby is included in this study in which daily determinations were not made for at least five days after birth, the only exception being in infants in which hemorrhagic manifestations developed in which the infant's blood was not being studied. In these

instances blood was withdrawn on the day that these first appeared and withdrawn daily thereafter.

Prothrombin determinations were made by the method described by Quick on the plasma of 1 cc. of blood. All blood was withdrawn intravenously in chilled oiled syringes and any sample containing cerebrospinal or tissue fluid was discarded (these precautions are probably unnecessary, but as we were making other determinations at the same time that required such precautions this method was used). Thromboplastin was made from rabbit brain as described by Quick. The potency of this material was tested before each prothrombin estimation and all samples that did not check with normal blood at twelve to thirteen seconds were discarded. Three prothrombin determinations were made on each sample of blood.

The biphasic method of Warner, Brinkhous and Smith³ was used as a check at intervals. This gave a slightly lower prothrombin value on individual samples of blood than the Quick method.

In estimating the coagulation values, the blood was taken from the syringe that was used to withdraw the blood for the prothrombin determinations. It was therefore venous. The capillary tube method of Rudolf⁴ was used with the tubes and blood kept at a constant temperature of 80 F.

Vitamin C determinations were made by the method of Abt and Farmer.⁵ Both micro and macro methods were used.

RESULTS

The prothrombin values during the first ten days of life are shown in chart 1. In the normal newborn baby this is the average obtained on 356 plasma prothrombin determinations in 55 individual infants. For the newborn baby given vitamin K at birth 268 plasma prothrombin determinations on 40 individual newborn babies, and for the newborn in which vitamin K was given the mother before the birth of the child 82 plasma prothrombin determinations in 15 individual newborn babies.

Table 1 lists the number of hemorrhages in the two groups of newborn babies and table 2 the cerebral hemorrhages. Chart 2 is a spot index of the plasma prothrombin content of the blood in 12 newborn babies that exhibited various hemorrhagic manifestations and contains 88 determinations.

Table 3 gives the mortality of both groups studied and table 4 the mortality of the premature babies of both groups studied.

COMMENT

In the two groups of babies observed there were roughly 12 per cent less completely breast fed babies and 12 per cent more artificially and partly breast fed babies in the control group than in the group given vitamin K. Whether this makes any difference in comparison we do not know. Salmonsens⁶ has stated that he observed no hemorrhagic disease of the newborn in over 1,000 infants when given cow's milk formulas during the first two days of life. We were unable to find any difference in either the prothrombin values

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Read at the fifty-third annual meeting of the American Pediatric Society, Hot Springs, Va., May 22, 1941.

1. Quick, A. J., and Leu, M. J.: Quantitative Determinations of Prothrombin, *J. Biol. Chem.* 119: lxxx (June) 1937.

2. Owen, C. A.; Hoffman, G. R.; Ziffren, S. E., and Smith, S. P.: Blood Coagulation During Infancy, *Proc. Soc. Exper. Biol. & Med.* 41: 181, 1939.

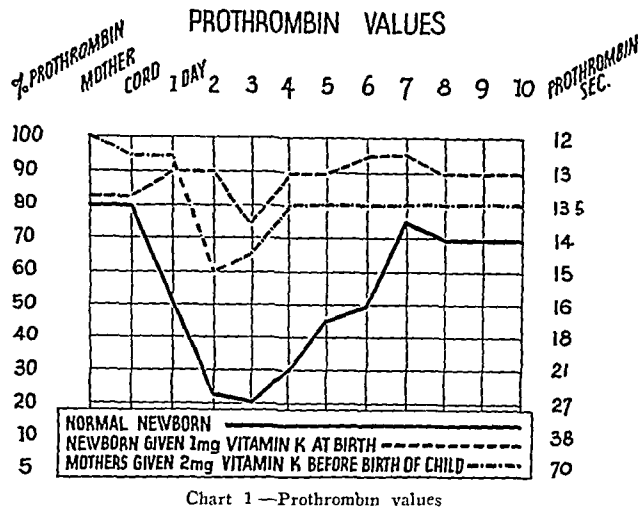
3. Warner, E. D.; Brinkhous, K. M., and Smith, H. P.: A Quantitative Study on Blood Clotting: Prothrombin Fluctuations Under Experimental Conditions, *Am. J. Physiol.* 114: 667 (Feb.) 1936.

4. Rudolf, R. D.: A Clinical Method of Estimating the Coagulating Time of the Blood, *Am. J. M. Sc.* 140: 807, 1910.

5. Abt, A. F.; Farmer, C. J., and Epstein, I. M.: Normal Cerebral Acid Determinations, *J. Pediat.* 8: 1, 1936.

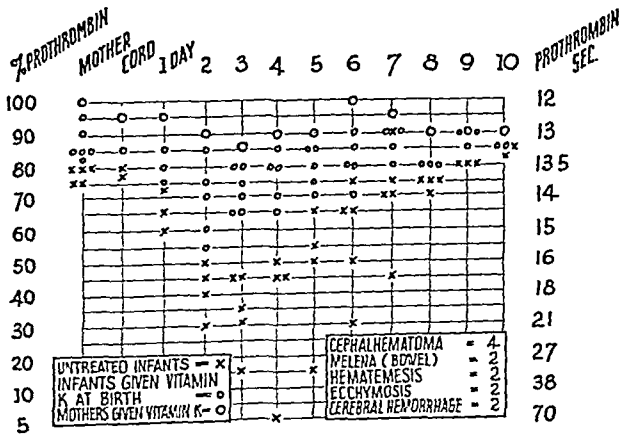
6. Salmonsens, L.: On the Prevention of Hemorrhagic Disease of the Newborn by the Administration of Cow's Milk During the First Two Days of Life, *Acta Paediat.* 28: 1, 1940.

or hemorrhagic manifestations between the breast fed or artificially fed groups. We were also unable to find any difference in either prothrombin values or hemorrhagic manifestations in the parity of the mother, season of birth, type of delivery (except cerebral hemorrhage) or weight of the baby.



The plasma prothrombin values for the mothers of the control group were consistently around 80 per cent, with similar values for those mothers whose infants were given vitamin K. We could find no differences in parity of the mother or type of delivery. By giving vitamin K to the mother (2 mg. of menadione) this value could be increased 20 per cent. In both the normal control newborn and those given vitamin K at birth the value of the plasma prothrombin in the cord blood was similar to that of the mother. In infants in which the mother was given vitamin K before delivery, cord blood prothrombin was lower than the mother's plasma prothrombin, but as this was considerably higher than untreated mother's, the cord plasma prothrombin was higher than that of the normal infants. It was

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found that, to exert any effect on the baby, vitamin K should be given at least five hours before delivery.

In the normal newborn the prothrombin values fall rapidly throughout the first, second and third days of life and rise just as rapidly during the fourth, fifth, sixth and seventh day, and continue at this level for the remainder of the newborn period. Almost all

observers⁷ are agreed on this decline in the plasma prothrombin value of the blood of the newborn. Infants whose plasma prothrombin did not decrease as much on the first day showed a less total decline by the third day and, conversely, those that showed an early decrease would be lower on the third day. We found two newborn babies in which the prothrombin fell to only 5 per cent on the third and fourth day. One of these showed no symptoms of any kind and progressed normally. The other vomited blood on the third day of life and again on the fifth day when the prothrombin had begun to rise, not on the fourth day at its lowest point.

In the infants given vitamin K at birth this decrease was prevented by an increase in plasma prothrombin values above cord values on the first day, which continued into the second, fell to a little less than cord plasma prothrombin values on the third day, then rose to 10 per cent above cord values on the fourth day and continued during the newborn period at slightly above the value for the normal newborn not given vitamin K.

In the infants whose mothers were given vitamin K before birth the cord plasma prothrombin was about 15 per cent higher than that of the newborn whose mothers were untreated and continued at this value during the first day. On the second day it fell to

TABLE 1.—Hemorrhagic Manifestations

Type	Untreated Infants (982)	Per Cent	Infants Given Vitamin K (711)	Per Cent
Conjunctival	21	2.1	12	1.7
Vaginal	11	1.1	8	1.1
Cephalhematoma	7	0.7	5	0.7
Petechial and ecchymosis	6	0.6	6	0.8
Cerebral	5	0.5	4	0.6
Hematemesis	5	0.5	4	0.6
Umbilical	5	0.5	3	0.4
Circumcision	3	0.3	3	0.4
Melena (bowel)	3	0.3	2	0.29
Total	66	6.6	47	6.59

slightly above the values for the normal newborn. On the third and fourth days it rose to values similar to the cord blood of the untreated newborn and continued as such throughout the newborn period. This is slightly higher than the normal newborn and slightly lower than when the newborn baby was given vitamin K at birth.

Obviously, therefore, there is a marked diminution in the plasma prothrombin content of the newborn baby's blood on the first day of life as compared to cord blood. This decrease continues until the third day of life and then rises to almost cord value by the seventh day and continues throughout the newborn period. It is also evident that this prothrombin content may be considerably increased by the administration of vitamin K to either the mother or the child. Let us now see if any clinical difference between these two groups can be demonstrated.

A word of explanation is necessary in the listing of the hemorrhagic manifestations. Conjunctival hemor-

7 Bray, W. E., and Kelly, O. R. Prothrombin Studies in the Newborn, *Am J Clin Path* 10: 154 (Feb) 1940. Fitzgerald, J. E., and Webster, Augusta. Effect of Vitamin K Administered to Father or Labor, *Am J Obst & Gynec* 10: 413 (Sept) 1940. Kato, K., and Poncher, H. G. The Prothrombin Content of the Blood of the Maternal and Immune Infant, *J A M A* 114: 749 (March 2) 1940. Effect of Intraperitoneal and Neonatal Administration of Vitamin K in the Newborn, *Brit M J* 1: 839 (May 25) 1940. Nygaard, K. K. The Phylactic and Curative Effect of Vitamin K in Hemorrhagic Disease of the Newborn, *Acta obst et Gynec Scandinav* 10: 361, 1939. W. W. Jr., and Lawson, G. M. Hemorrhagic Diathesis of the Newborn, *J A M A* 115: 1416 (Oct 26) 1940.

rhages are very common in the newborn. Many newborn babies will show small ones if one looks carefully. Those listed are only the larger ones that exist close to the eyeball and are very easily seen. The same is true of petechial hemorrhages and ecchymosis. Many newborn babies for the first day or two of life will show petechial hemorrhages over the scalp and forehead. Also small bruises are frequently encountered, particularly after a long labor or one requiring instruments. We have listed only petechial hemorrhages if they occurred on the body, and ecchymoses only if the spots were large and not in an area subjected to trauma. Many infants will spit up brown material and hematin crystals during the first day of life. These are not included, but only those that vomited visible blood. Bleeding from the bowel is similar; this does not include stools positive for blood but those in which there was visible blood. Umbilical hemorrhages and circumcisions were listed only if considerable blood was lost, not simple slight oozing.

It will be seen from the number of these hemorrhagic manifestations that occurred in both groups that there is no difference in their frequency. In other words, whether the newborn received vitamin K or not, or whether the prothrombin level is low or not, these hemorrhagic manifestations occur. This is shown by the spot chart of twelve newborn babies that had hemorrhagic manifestations in which the plasma prothrombin

TABLE 2.—Cerebral Hemorrhage

Infants Untreated (982)			Infants Given Vitamin K (711)		
Month	Result	Vitamin C	Month	Result	Vitamin C
Aug.	Died (autopsy)	0.25 mg.	Oct.	Died (autopsy)	0.1 mg.
Nov.	Died (autopsy)		April	Died (autopsy)	
July	Recovered	0.03 mg.	Aug.	Recovered	0.3 mg.
Oct.	Recovered	0.2 mg.	Sept.	Recovered	0.25 mg.
June	Recovered				
Total, 5.....		0.53%	Total, 4.....		0.56%

values were estimated. Only four of these were in a series in which we were studying the blood before the hemorrhage occurred, which accounts for the lack of values for cord blood. The remainder were taken as soon as the hemorrhage was observed. In these infants the value of the mother's plasma prothrombin was estimated on that day instead of at birth. As will be seen in the chart, the values correspond as to whether or not the baby received vitamin K. In the normal newborn the values were low; if vitamin K had been administered, the values were higher. The highest values that we found on any newborn baby were those in which the mother had been given vitamin K before the birth of the child. The prothrombin level was never below 90 per cent, yet this baby had a large cephalematoma, which developed on the second day and increased during the third day. Conversely, one of the lowest prothrombin values that we obtained was in one of the untreated newborn babies in which the prothrombin value on the third day when it vomited blood was only 30 per cent, 20 per cent below normal values. This fell to only 5 per cent on the fourth day with no symptoms. On the fifth day it rose to 15 per cent and the baby vomited blood again. It then rose rapidly to 70 per cent and continued at this value with no more signs of hemorrhage.

We have listed the cerebral hemorrhages separately, as these are the most important of the hemorrhagic group. First we must state that we are never certain

of the diagnosis of cerebral hemorrhage. Four infants of both series died and autopsies were obtained. In these the diagnosis was confirmed. In the other 5, all we can say is that in our best judgment they conformed to the accepted diagnosis of cerebral hemorrhage. It will be observed that the frequency is the same for the two groups. All four of the infants that died were delivered instrumentally, and, of the remaining 5, 2

TABLE 3.—Mortality of Infants During Study

Untreated Infants (982)		Infants Given Vitamin K (711)	
	Autopsy		Autopsy
Cerebral hemorrhage.....	Yes	Cerebral hemorrhage.....	Yes
Cerebral hemorrhage.....	Yes	Cerebral hemorrhage.....	Yes
Nuclear icterus.....	No	Nuclear icterus.....	Yes
Atelectasis.....	Yes	Atelectasis.....	Yes
Congenital defect of lung.....	Yes	Congenital deformities.....	No
Congenital heart.....	Yes	Congenital heart.....	Yes
Hydrocephalus.....	No		
Cause unknown.....	Yes		
Total 8 deaths.....	0.81%	Total 6 deaths.....	0.84%

were delivered instrumentally, 1 was a breach presentation and 2 followed normal deliveries. We have listed the month of these cerebral hemorrhages, as Salmonsen has stated that hemorrhagic disease is most frequent in the spring and late winter, and most infrequent in the summer and fall. This would be a nice point in demonstrating that cerebral hemorrhage is unrelated to hemorrhagic disease, but unfortunately we were unable to find any seasonal correlation either for any of the hemorrhagic manifestations.

We would like to call attention again to the low vitamin C values obtained in these instances of cerebral hemorrhage.⁸ In 2 of the infants that died these estimations were by the micro method, which has been questioned, but in the remainder the macro method was used in 3. It did not occur to us to check the vitamin C values in cephalematoma until recently. In the few estimations that have been made, these are also much lower than values obtained for the normal newborn.

In the premature infants studied during the two year period there are almost the same number of infants in each group. All these infants were fed either breast milk or equal parts of breast milk and lactic acid milk. The only hemorrhagic manifestation noted in either

TABLE 4.—Mortality of Premature Infants During Study

Premature Infants Untreated (45)			Premature Infants Given Vitamin K (48)		
Lived	Cause of Death	Autopsy	Lived	Cause of Death	Autopsy
1 hr.	Atelectasis.....	Yes	3 hr.	Atelectasis.....	Yes
2 hr.	Atelectasis.....	Yes	8 hr.	Atelectasis.....	Yes
6 hr.	Atelectasis.....	No	11 hr.	Atelectasis.....	Yes
8 hr.	Congenital heart.....	Yes	12 hr.	Atelectasis.....	No
48 hr.	Atelectasis.....	No	14 hr.	Cerebral hemorrhage.....	Yes
51 hr.	Atresia of bile ducts.....	Yes	30 hr.	Congenital heart.....	Yes
7 days	Congenital deformities.....	No	8 days	Cause unknown.....	No
Total 7 deaths.....		15.5%	Total 7 deaths.....		14.6%

group was that 1 of the untreated group passed a stool that contained blood on the third day. We did no prothrombin studies similar to those used on the full term newborn baby. Prothrombin values done on these by micro methods did not give consistent results. All of these premature babies had normal coagulation values for whole blood.

In recapitulation we find that, in our study of 1,693 newborn babies, the percentage of hemorrhagic mani-

8. Fleming, A. W., and Sanford, H. N.: Vitamin C Content of the Blood in Newborn Infants, *J. Pediat.* 13: 314 (Sept.) 1938.

festations found in the newborn period was approximately 6.6. These occurred in about equal numbers for the two groups, whether the prothrombin value of the blood was low or high or whether the infants or their mothers were given vitamin K or not. The question at once arises as to whether the quantity of vitamin K administered was sufficient. All we can say is that, in the infants given vitamin K in which estimations were made, its value was above that found in normal infants for the same time of life. These values are also above the accepted values for prothrombin found in other instances of hemorrhage due to prothrombin deficiency. Also in those infants showing hemorrhagic manifestations in which prothrombin estimations were made, high values for prothrombin were found if vitamin K had been given to the newborn baby or its mother, and lower values if it had not been given.

No one has satisfactorily explained these hemorrhagic manifestations that occur in the newborn period with the possible exception of the vaginal hemorrhages found in female infants. These have been assumed to be due to a female hormone reaction. Almost all newborn babies will spit up brown hematin crystals during the first day of life, and Bonar⁹ found that 30 per cent of the stools of the newborn were positive for blood. The older clinicians used to classify these hemorrhages into two groups, *melen a spuria* and *melen a vera*. In the former the infant always recovered no matter what treatment was given. In the latter the dread hemorrhagic disease of the newborn developed and the infant's recovery was doubtful.

In the reports of hemorrhagic disease during the newborn period that have been published recently it is apparent that all of these hemorrhagic manifestations have been lumped into the one term "hemorrhagic disease of the newborn," which, it is assumed, is due to a deficiency of prothrombin. We have been unable to show that these hemorrhagic manifestations were associated with a prothrombin deficiency, nor were they lessened by the administration of vitamin K.

We do not believe that these hemorrhagic manifestations are the same thing as true hemorrhagic disease of the newborn. To have a hemorrhage, two things are necessary: (1) a break in a vessel and (2) a failure of the blood to coagulate within normal limits. In none of the instances of hemorrhagic manifestations recorded was the coagulation time of the whole blood increased beyond five minutes. By the same technic the coagulation time of an adult's blood is from five to seven minutes. If these hemorrhagic manifestations are due to a failure of coagulation, one would have to assume that we have a hemorrhage in the newborn baby's blood that coagulates in less time than the coagulation of the adult's blood. This fact and the simple method of testing the coagulation time of the whole blood seem to have been overlooked in the last few years in an endeavor to split up the coagulation factors into components. It has been forgotten that the function of the blood when shed is to coagulate, and that every factor possible is brought to bear to cause this to take place. This is evidently the case in the blood of the newborn. In all adults whose blood we have examined in which a deficiency of prothrombin occurred in levels corresponding to the levels obtained for the newborn for the second, third and fourth days of life, the coagulation time of their blood was decidedly increased (over eight minutes). The newborn baby, therefore, must

have a wide margin of safety in all its coagulation elements because it has been found that not only prothrombin but calcium,¹⁰ fibrinogen¹¹ and platelet disintegration¹² are also diminished. Yet the blood of the newborn coagulates faster than that of the adult.

As we did not encounter an instance of coagulation of the whole blood greater than five minutes in any of these newborn babies, we do not believe that any of these infants suffered from hemorrhagic disease of the newborn. No treatment of any kind was given to the infants in which no vitamin K was given, and no more to the group given vitamin K than the initial administration. This, of course, does not correspond at all to the reports of the frequency of hemorrhagic disease of the newborn recently made, or to the number of infants in which recovery was brought about by the administration of vitamin K.

The explanation of this must lie in two points. Either we do not know what hemorrhagic disease is, or there is a marked difference in our newborn babies as compared to other localities. As to our infants being different, there is that possibility. All of these mothers have had antepartum care, and only rarely do any of our mothers deliver without some antepartum management. As we have found that the prothrombin content of the cord plasma is directly proportional to the prothrombin content of the mother's plasma, we can well imagine that through disease or faulty diet a mother might transmit to her baby a prothrombin content of the plasma that would be low enough to cause serious coagulation difficulties. We have never encountered such a condition, but it could well be. Also we had no congenital syphilis in our group. It has been known for years that syphilitic babies show hemorrhagic tendencies. It has been assumed that this was due to blood vessel disturbance, but it could be due to liver damage and consequently lowering of the prothrombin values. For any of these reasons, babies from mothers delivered without antepartum care might show a larger proportion of hemorrhages.

As to our ability to diagnose hemorrhagic disease of the newborn, the reader will have to decide just what is hemorrhagic disease of the newborn. Clifford¹³ states that the frequency of hemorrhagic disease in the newborn is from 1 in 118 to 1 in 333. This included "spontaneous external or internal hemorrhage occurring in the newborn, excluding that associated with trauma, accident or some definite disease." This is approximately a frequency of from 0.3 per cent to 0.85 per cent. On this basis we should consider as hemorrhagic disease our instances of hematemesis and bleeding from the bowel. As these numbered 8 instances in the normal group and 6 instances in the group given vitamin K, this would make our frequency of hemorrhagic disease in the newborn approximately 0.8 per cent, which corresponds to Clifford's values. Waddell and Guerry¹⁴ report "1 case of hemorrhagic disease of the usual variety" and 4 "subclinical hemorrhagic disease" in a series of 60 newborn babies. This makes an incidence of 8 per cent. Our incidence of hemorrhagic

10. Bakwin, Harry: Tetany in Newborn Infants, *J. Pediat.* **14**: 1 (Jan.) 1939.

11. Crane, Marian M., and Sanford, H. N.: Variations of the Fibrinogen Content in the Normal Infant, *Am. J. Dis. Child.* **51**: 92 (Jan.) 1936.

12. Leslie, E. I., and Sanford, H. N.: Quantitative and Qualitative Studies of Platelets in the Normal Infant, *Am. J. Dis. Child.* **51**: 592 (March) 1936.

13. Clifford, S. H.: Hemorrhagic Disease of the Newborn, *J. Pediat.* **14**: 333 (March) 1939.

14. Waddell, W. W., Jr., and Guerry, DuPont, III.: The Role of Vitamin K in the Etiology, Prevention and Treatment of Hemorrhages in the Newborn Infant, *J. Pediat.* **15**: 222 (Dec.) 1939.

9. Bonar, B. E.: Blood in Stools of the Newborn, *Am. J. Dis. Child.* **36**: 725 (Oct.) 1928.

manifestations was only 6⅓ per cent; but if we had included more of the smaller conjunctival hemorrhages or perhaps spitting up of hematin crystals, this number could be easily increased to their figures.

On the other hand, Shtern¹⁵ found the condition in 15 newborn babies in 30,627 births, an incidence of 1 in 2,000 infants, and Coppolino¹⁶ 1 in 1,548 births. These discrepancies are due to the definition of hemorrhagic disease of the newborn as interpreted by various authors. Those who report the smaller number of instances consider only those instances of spontaneous hemorrhage in which definite prolongation of the coagulation time of the blood can be shown. On the other hand, those authors who consider cerebral hemorrhage, cephelematomas, conjunctival hemorrhages, spitting up of blood and hematin crystals, cord oozing, petechial hemorrhages, blood in the stool and vaginal hemorrhage as hemorrhagic disease of the newborn will report the greater number.

As stated before, we do not consider any of our infants to have suffered from hemorrhagic disease of the newborn because their coagulation values were within normal limits. This is not surprising, because in the last ten years our frequency of hemorrhagic disease of the newborn by such standards has been 1 in 2,500. Again, if we are failing to diagnose hemorrhagic disease of the newborn our last point is that we should, according to the numbers of infants that have been reported as having been cured of this dread condition, have a considerably higher mortality in our untreated infant group over the group given vitamin K. As will be observed in table 4, the mortality of the two groups of infants is practically the same. There were no internal or external hemorrhages with the exception of the cerebral hemorrhages in either group of infants that died.

The most important point in this entire problem is that of cerebral hemorrhage and its association to hemorrhagic disease of the newborn. We have never observed a cerebral hemorrhage associated with hemorrhage elsewhere in the newborn or in any increase in coagulation values of the whole blood. We were able to estimate prothrombin values in only 2 of our 8 cases of cerebral hemorrhage. In the infant given vitamin K at birth it was high, and in the 1 untreated lower, but not lower than in the normal newborn baby. In all of these cases of cerebral hemorrhage the coagulation of the whole blood was less than five minutes. It is only fair to state that only 4 of these were proved by autopsy, and that in each of these the lesion was a tear through the tentorium. No other signs of hemorrhage in the body were found. The one premature infant that died of cerebral hemorrhage had the same pathologic condition. On the other hand, Salmonsens¹⁷ states that he has found instances of cerebral hemorrhage associated with coagulation prolongation and hemorrhagic disturbances.

While we found no difference in the number of instances of cerebral hemorrhage in our infants treated with vitamin K and untreated infants, we do not feel that our instances of cerebral hemorrhage are large enough to dismiss definitely this form of therapy. As we have no specific therapeutic treatment for this condition at the present time, and as we have found that

vitamin K by mouth will raise the prothrombin value of the newborn blood within four hours from administration, it certainly would do no harm to administer vitamin K to any infants suspected of such a condition. Certainly this is much superior to giving them small intramuscular injections of whole blood, which could not possibly have any value except the psychic effect on the parents.¹⁸ We would also recommend giving infants suspected of cerebral hemorrhage vitamin C. While our frequency of cerebral hemorrhage is relatively low, we have found blood vitamin C consistently low in newborn infants with cerebral hemorrhage for the last five years.

In our premature infant studies, while only one infant in the untreated group showed any hemorrhagic tendencies, and this one recovered spontaneously, we again feel that 98 premature infants is hardly enough from which to draw any definite conclusions. None of these premature infants had coagulation values of over five minutes. Micro methods of estimating prothrombin on these premature infants we did not find satisfactory; so we can make no statements about these values, but certainly from the coagulation values of the whole blood no differences were found over the full term infant. The mortality was practically the same for the untreated and the treated group, and the only cerebral hemorrhage in either group was in the group given vitamin K (table 4).

It is unfortunate that we did not encounter any infants with abnormal coagulation functions, such as those reported in which no prothrombin can be found or those in which the coagulation of the whole blood is greatly prolonged. It seems to us that it is rather unnecessary to estimate prothrombin values in the newborn under the average clinical conditions unless there is a prolongation of the coagulation time of the whole blood, which can be shown by simple methods. If such a prolongation exists, its cause can be determined.

CONCLUSIONS

One thousand, six hundred and ninety-three newborn infants were observed during the first ten days of life, over a period of two years. Vitamin K was administered to 711 of these infants. In 606 plasma prothrombin determinations it was found that the prothrombin content of the cord blood plasma of the normal infant was similar to the prothrombin content of its mother's blood plasma. During the newborn period the plasma prothrombin diminished during the first, second and third days of life in descending proportions. It increased during the fourth, fifth and sixth days of life and almost returned to cord value from the seventh day throughout the newborn period. The value of plasma prothrombin could be increased above cord plasma prothrombin value by the administration of vitamin K to the infant. The plasma prothrombin of the mother and the cord plasma prothrombin of her infant were both increased above normal values by the administration of vitamin K to the mother before the birth of her child. The plasma prothrombin values of infants given vitamin K or given to their mothers before delivery is well above that of normal infants throughout the newborn period.

However, the administration of vitamin K did not affect the frequency of hemorrhagic manifestations. There were just as many conjunctival, vaginal, petechial, cerebral and umbilical hemorrhages, cases of melena

15. Shtern, I. A.: Symptomatology, Therapy and Prophylaxis of Melena Neonatorum, *J. russk. det. v. 12*: 396 (Nov.) 1932.

16. Coppolino, J. F.: Hemorrhagic Disease of the Newborn, *Atlantic M. J.* 31: 300 (Feb.) 1928.

17. Salmonsens, Lief: Morbus Hemorrhagicus Neonatorum, *Acta pædiat.* 27: 1, 1939.

18. Sanford, H. N., and Leslie, E. I.: Hemorrhagic Disease of the Newborn and the Value of Intramuscular Injections of Blood, *J. Pediat.* 12: 16 (Sept.) 1938.

and cephalatomas in one group as in the other. The percentage of mortality for the two groups was the same.

There were no hemorrhagic manifestations in either group in which the coagulation time of the whole blood was increased over normal (five minutes). As judged by this standard, our frequency of hemorrhagic disease of the newborn for the last ten years has been one in twenty-five hundred.

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A COMPARATIVE STUDY OF FIBRILLATION AND TREMOR

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This study was undertaken in an effort to ascertain whether or not the coarse fibrillation seen in the skeletal muscles of man is in the same category as tremor and to learn what factors influence it. The term "coarse fibrillation" is used advisedly in order to avoid confusion with the type of fine muscle action which physiologists call "fibrillation." Denny-Brown and

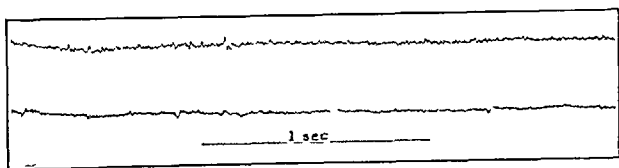


Fig 1.—Surface solder electrode recordings from lip (upper) and platysma (lower), showing the absence of fibrillation during rest

Pennypacker¹ have studied a type of fine muscle contraction following complete muscle denervation. These fibrillations are invisible through the skin. They call these contractions "true fibrillations" and refer to the fibrillations visible through the skin as "fascicular contractions." In this paper we are dealing with the phenomenon of irregular muscle contractions visible through the skin as "rippling," which clinicians have called fibrillation.

Brain² states: "Fibrillary twitching of muscles is seen in its most typical form as a result of chronic degeneration of the anterior horn cells." This is generally accepted. In what particular way fibrillation is related to damage to neurons is not clear. Russel, Odom and McEachern³ state that fibrillations occur totally independent of nervous control; they have shown that peroneal nerve block does not stop fibrillation in the distal part of the leg.

Tremor has been studied by one of us,⁴ and the following conclusions were reached:

1. Tremors of all kinds have a common pathophysiological basis. They are regarded as muscular responses

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1. Denny Brown, D., and Pennypacker, J. B. Fibrillation and Fasciculation in Voluntary Muscle, *Brain* 61: 311-334 (Sept.) 1938

2. Brain, W. R. Diseases of the Nervous System, New York, Oxford University Press, 1933, p. 13.

3. Russel, C. K., Odom, G. L., and McEachern, Donald. Physiological and Chemical Studies of Neuromuscular Disorders, *Tr Am Neurol A* 64: 120-124, 1938

4. de Jong, Herman. Action Tremor, *J Nerv. & Ment Dis* 64: 111 (Jul.) 1926. Phenomenes rythmiques du système nerveux normal et malade. *Rev. neurol* 1: 367-377 (March) 1928. de Jong, Herman. Physiological and Psychological Tests in Tremors and Related Phenomena, *Nederl. tijdschr. geneesk* 1: 472-474 (Jan 28) 1928. de Jong and Schaltenbrand. *de Jong and Herman.*

to rhythmic discharges in various motor cells in the central nervous system.

2. The so-called physiologic tremor can be obtained in a normal person after "overinnervation," e. g. clenching the fists with utmost force. Since this is a purposive act, it is likely that the motor cortex cells give rise to the rhythmic discharge seen as physiologic tremor.

After alteration of motor cells by disease, degeneration or intoxication, the threshold of neuron discharge is lowered and a minor innervation may produce rhythmic discharges resulting in tremor. The prototype of this pathologic tremor is found in paralysis agitans. Such a patient may shake all day but the tremor always stops during sleep. If, however, some slight stimulus is administered during sleep without awakening the patient, the tremor reappears briefly. In this way the dependence of tremor on stimulus from the outside is shown.

3. The rate of tremor is dependent on the location of the discharging cells in the central nervous system. The rate of 9 to 15 vibrations a second is typical for tremor originating in the cerebral cortex. The so-called physiologic tremor and the tremors of alcoholism, thyroid disease and dementia paralytica are examples of tremors of this high rate. Tremor originating in the corpus striatum has a rate of 5 to 6 a second, as in Parkinson's disease, tumor or other lesions of the motor cells of the corpus striatum. Tremor originating from discharging motor cells of the nucleus ruber occurs at the rate of 3 to 4 a second, as pointed out in the case of a patient with Benedikt's syndrome. Cells of the anterior horn of the spinal cord discharge at the rate of 6 to 7 a second. Its rhythmic muscular effect, however, is not called "tremor" but "clonus." In cerebellar lesions, adventitious movements simulating a tremor are known. Mechanographic recording reveals that this phenomenon is mostly arrhythmic and therefore not a tremor.

METHOD

Fibrillations were studied in 2 cases of progressive muscular atrophy. In the present study tremor was studied in 3 cases of Parkinson's syndrome. Forty-one experiments were performed. Potentials were recorded

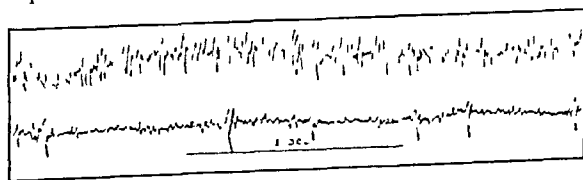


Fig 2.—The same as figure 1, showing muscle activity in the lip record and fibrillations in the platysma record when the subject protrudes his tongue

by an ink-writing oscillograph. In the first experiments, two solder disks applied to the skin with celloidin solution were used as electrodes. In later experiments, coaxial needles, which were made according to the method described by Adrian and Bronk,⁵ were inserted into the muscles in order to record potentials from single motor units.

The results of the two methods are the same, but the latter method gives a somewhat more detailed picture of muscle activity.

5. Adrian, E. D., and Bronk, D. W. The Discharge of Impulses in Motor Nerve Fibers. II. The Frequency of Discharge in Voluntary Contractions, *J Physiol* 67: 119-151 (March) 1927

RESULTS

I. Effect of Muscle Activity.—A. One patient with progressive muscular atrophy showed very little fibrillation in the right sternocleidomastoid, platysma, tongue and digastric muscles at rest. After the tongue was protruded many gross fibrillations were recorded in these muscles as well as some involuntary contractions of the large fascicular type (figs. 1 and 2). Voluntary contraction of the leg muscles did not produce an increase in fibrillation in the muscles tested. In the second patient this effect of muscle activity on fibrillations was also observed but to a lesser degree than in the first patient.

B. In a patient with parkinsonian tremor, muscular contraction may stop tremor in the contracting muscle but may increase tremor in other muscle groups.

II. Effect of Tapping.—When a fibrillating muscle is tapped, fibrillation may increase in it or reappear if it has stopped temporarily. Tapping a normal muscle does not provoke fibrillation. Tapping has no effect in tremor.

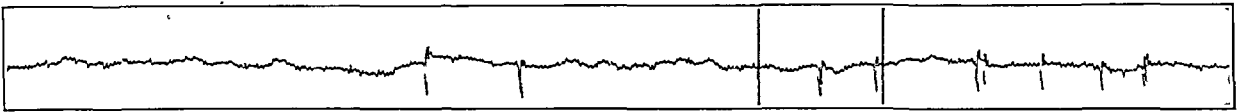


Fig. 3.—Needle electrode recording showing fibrillations in an arm muscle. The distance between the heavy vertical lines is one-half second.

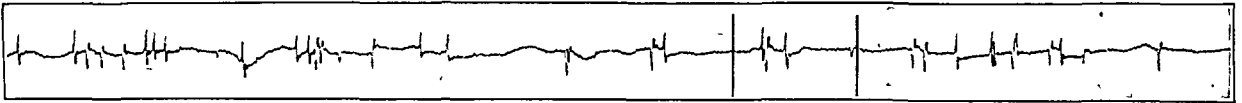


Fig. 4.—The same as figure 3, after injection of prostigmine methylsulfate. A definite increase in the amount of fibrillations is evident.



Fig. 5.—Needle electrode recording showing tremor and mechanogram in a case of paralysis agitans.

III. Effect of Sensory Stimulation.—A. In fibrillation, no effect on the amount, frequency or intensity of fibrillation was observed as the result of touching or of pricking the skin at any point on the body. Smells, loud noises and the sudden appearance of bright light were ineffective in changing the amount of fibrillation. The application of an ice cube to the skin yielded uncertain results.

B. Sensory stimulation of all kinds may increase tremor, as stated in former publications.

IV. Effect of Emotion.—A. In fibrillation, when quick, threatening movements were made in the direction of the face or eyes no increase in fibrillation was noted. Mental arithmetic, which produced some degree of anxiety when the task was of sufficient difficulty, was never observed to produce any definite effect on fibrillation.

B. The same emotional stimuli usually increase the amplitude of tremor.

V. Effect of Drugs.—1. Prostigmine methylsulfate: A. In fibrillation, prostigmine methylsulfate in amounts of 1.5 mg. given intramuscularly (with atropine 1 mg. to avoid an unpleasant side reaction) was uniformly

found to increase the number of fibrillations. The following protocol illustrates this:

Sept. 6, 1940 needle electrodes were placed in the flexor carpi ulnaris and brachioradialis muscles. Fibrillations occurred arrhythmically at the average rate of 12 in five seconds during the resting period. Six minutes after the injection of prostigmine methylsulfate 1.5 mg. combined with atropine sulfate 1 mg., fibrillations averaging 13 in five seconds were visible. Ten minutes after the injection, fibrillations averaged 35 in five seconds (figs. 3 and 4).

B. Prostigmine methylsulfate did not exert any effect on tremor, as illustrated by the following protocol:

Jan. 14, 1941 solder electrodes were placed over the first interspace of the hand, at the flexor carpi radialis muscle, and an indifferent electrode was placed over the styloid process of the radius. Tremor rhythm of about 5 vibrations a second was recorded. The mechanogram was shown as well as the electromyogram. The minimum amplitude of tremor was present when the hand was placed on a pillow. In a more active position (hand on arm of chair) the tremor was more pronounced, whereas it gained a maximum if the left arm was held in a half bent position in the air.

At 10 a. m. an injection of prostigmine methylsulfate 1.5 mg. and of atropine 0.6 mg. was made. Immediately after the injection an increase in amplitude occurred, apparently owing to an emotional reaction from the injection since it appeared immediately after the injection.

At 10:15 a. m. the emotional reaction diminished on the record and reached the same level at which it stood before the injection. If the hand rested on the pillow, tremor again reached a minimum.

At 10:30 a. m. the tremor stopped almost completely. Later on it reappeared when the patient had the "arm half-bent" after he had been talking, as before the injection. No effect of the prostigmine methylsulfate was noted.

2. Barbiturate: A. Soluble pentobarbital 0.2 Gm. was given by mouth on several occasions. No change in the amount of fibrillation could be made out during the waking or sleeping states. On one occasion when the patient was drowsy a hypnotic trance was induced. Here also no change in fibrillation was noted.

B. After soluble pentobarbital 0.2 Gm. the patient became very drowsy, but there was no change in the tremor record. In forty-five minutes the patient was sleeping soundly; no tremor could then be recorded. Noise was made by scratching on the wire of the

Faraday cage and the tremor reappeared, at first with small amplitude and later with normal amplitude. The motor of the apparatus was shut off to reduce the barrage of auditory stimuli. After a minute another record was taken and no tremor could be recorded. The patient was awakened, whereupon the usual tremor record was obtained. This experiment of recording tremors of the sleeping, being stimulated and awakening was repeated three times, always with the same effect; namely, absence of tremor during sleep and reactivation of tremor during sleep by auditory stimuli. That it was not the drug but the state of being asleep which caused the tremor to disappear is obvious, since the drug was active during the interval between these experiments (figs. 5 and 6). The same result was obtained during natural sleep.

3. Bulbocapnine phosphate: A. Bulbocapnine phosphate 75 mg. given intramuscularly had no effect on fibrillation.

B. de Jong and Schaltenbrand⁶ found that bulbocapnine suppressed tremor in some patients for a time but was ineffective in other patients.

that other pharmacologic agents such as phenobarbital and atropine have no such arresting influence.

VI. *Nerve Block*.—A. The ulnar nerve was blocked at the elbow by the injection of 2 per cent procaine hydrochloride into and about the nerve. Galvanic stimulation of the skin over the nerve that produced a muscle reaction before the injection failed to cause any muscle contraction after injection. Fibrillation continued without change in the muscles supplied by the median and ulnar nerves.

B. Ulnar and median nerve blocks were performed in a case of paralysis agitans by the injection of 2 per cent procaine hydrochloride into and about the nerves. Tremor oscillations of the thenar muscles ceased. Corresponding to the recording was the fact that before injection tremors were visible in the thumb; after the nerve block this tremor could not be seen.

COMMENT

Our experiments show that purposive movements increase the amount of fibrillation in the muscles involved. Tremor amplitude is increased after motor,

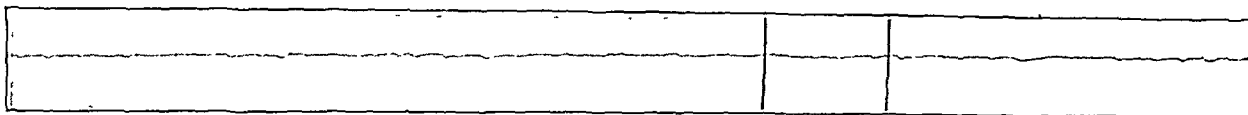


Fig. 6.—The same patient as figure 5. The record shows no tremor because the patient is asleep.

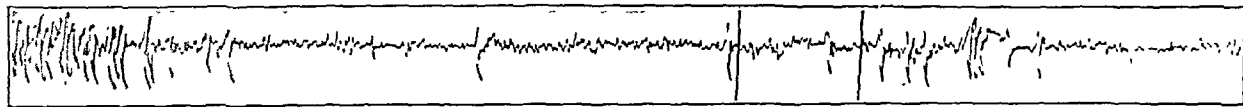


Fig. 7.—Surface electrode recording from the tongue showing fibrillations.

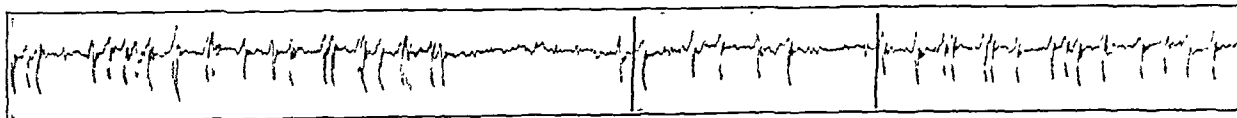


Fig. 8.—The same as figure 7, showing the persistence of fibrillations after scopolamine 0.3 mg. intramuscularly. The space between the heavy vertical lines is one second.

4. Scopolamine hydrobromide: A. Fibrillation persisted after the intravenous injection of scopolamine hydrobromide 0.3 mg. (figs. 7 and 8).

B. Tremor disappeared completely after injection of scopolamine. The following protocol illustrates this.

10:00 a.m., record shows regular tremor.

10:04, scopolamine hydrobromide 0.6 mg., given intramuscularly.

10:09, tremor somewhat diminished.

10:15, tremor absent. Record shows smooth line. Patient is awake and clenches fist in response to command. On inspection of the patient no tremors can be seen anywhere.

10:22, patient asleep. Record shows smooth line.

This protocol shows that the response obtained is due to scopolamine and not to the influence of sleep, in contrast to the results obtained with soluble pentobarbital. Experiments by de Jong and Herman⁷ have shown

sensory and emotional stimulation. Prostigmine methylsulfate decidedly increases the amount of fibrillation, whereas this drug exerts no effect on tremor. Fibrillation persists after blocking of the ulnar nerve during sleep and after the injection of scopolamine hydrobromide.

Our experiments confirm the observations of Russel, Odom and McEachern concerning the effect of prostigmine methylsulfate on fibrillation and the persistence of fibrillation after nerve block. The conclusion of these authors is that fibrillations are of peripheral origin and "not due to disordered impulses coming down from anterior horn cells." Grund⁸ found that fibrillations persisted during spinal anesthesia.

Denny-Brown and Pennypacker concluded from their experiments that hyperexcitability of the motor neuron, in progressive muscular atrophy or amyotrophic lateral sclerosis, for example, results in periodic discharges of single impulses by the motor neuron and that the focus of discharge is not the synapse but within the neuron.

The interpretation of our experiments leads us to the following conclusion: in muscles whose nerve sup-

6. de Jong, Herman, and Schaltenbrand, G.: The Action of Bulbocapnine on Paralysis Agitans and Other Tremor Diseases, *Neurotherapie* 6: 61-72, 1924.

7. de Jong, Herman, and Herman, William: The Action of Bulbocapnine in Three Cases of Paralysis Agitans and in One Case of Tremor of Paralysis Agitans Type: A Further Note with a Comparison of the Action of Scopolamine, Atropine and Phenobarbital, *Arch. Neurol. & Psychiat.* 16: 55-62 (July) 1926.

ply is slowly degenerating, fibrillation may occur independently of the central nervous system. However, since impulses for voluntary movement may increase fibrillation, it is clear that impulses coming down from the central nervous system may exert an influence on fibrillation.

The accompanying table shows the differences observed between fibrillation and parkinsonian tremor.

On the basis of these differences, it is clear that fibrillation and parkinsonian tremor are phenomena of different natures. In previous publications one of us (de J.) demonstrated that rhythmic phenomena of the central nervous system, such as tremor, must be regarded as the muscular effect of rhythmic discharges in motor nerve cells of different levels of the central nervous system. These rhythmic discharges are induced and influenced by afferent impulses. The evidence for this has consisted up to this time in experiments on patients with paralysis agitans in whom tremor which had ceased completely during natural sleep, as recorded by a mechanogram, could be reactivated by stimuli

Differences Between Fibrillation and Parkinsonian Tremor

Fibrillation	Tremor
Arrhythmic	Rhythmic
Irregular rate	Constant rate
Present during sleep	Absent during sleep
Present after scopolamine hydrobromide	Absent during scopolamine hydrobromide
Present after bulbocapnine phosphate	May be absent after bulbocapnine phosphate
Increased after prostigmine methylsulfate	Not affected by prostigmine methylsulfate
Present after nerve block	Absent after nerve block
Activated by impulses for voluntary movement	Activated by all stimuli
Activated by mechanical stimulation of muscle	
Not affected by pinprick, cold or emotion	

without waking the patient. This indicates that tremor is of central origin. Considering the facts presented in the table, it is obvious that fibrillation cannot be of central origin.

Fibrillation appears to be secondary to long continued, slow destruction of the anterior horn cells but not due to disease of the cells directly. Once started, fibrillation continues in the muscles after they have been disconnected from the anterior horn cells by nerve block.

SUMMARY

In this study the influence of sleep, nerve block, various stimuli and various drugs on fibrillation and tremor has been examined. The results lead to the conclusion that fibrillation and tremor are in different categories. Tremor is caused by rhythmic discharges from motor nerve cells whereas fibrillation is a phenomenon occurring primarily in muscles whose nerve supply is slowly degenerating. Impulses from the central nervous system and some physical stimuli directly applied to the muscle may increase fibrillation but not cause it.

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S. Grund, George: Ueber die Entstehung des fibrillären Muskelzuckungen bei spinalen Amyotrophien, Deutsche Ztschr. f. Nerven. 145: 99-103, 1930.

SIMPLIFIED HORMONAL TREATMENT OF AMENORRHEA

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Amenorrhea may be a symptom of a general disease (diabetes, tuberculosis) but usually is of endocrine origin. As these conditions are often seen by the general practitioner, it is important for them to become acquainted with a simplified form of treatment. The tests for making clinical and hormone studies in these cases are frequently not at his disposal and therefore it is my aim in this paper to suggest a simplified method for producing bleeding in amenorrheic women.

The absence of menstrual bleeding is the cause of much concern to women. They suffer psychically and often an inferiority complex develops. The associated nervous and vasomotor disturbances frequently prevent these patients from attending their daily duties. As long as one is unable to put the motor of ovarian function into action, by means of gonadotropic stimulation therapy, one has to try at least to produce bleeding with normal substitution therapy. It is known that uterine bleeding may occur either from a proliferative (pseudomenstruation) or from a progestational mucous membrane (menstruation). To the women, it is of little significance from what anatomic structure of the uterine mucosa bleeding occurs. The two types of bleeding, from a proliferative and from a progestational endometrium, produce the same psychic and physical effects. Up until now it was generally thought that to produce bleeding the uterine mucosa had to be stimulated to proliferation by estrogenic hormone first and then the secretory phase had to be induced by progesterone. The doses required are from 30 to 40 mg. of estradiol benzoate and from 30 to 40 mg. of progesterone.¹ The treatment lasted twenty-five days. Daily injections of estrogen are not necessary, eight injections of 5 mg. each (estradiol benzoate) in the space of twenty days being sufficient, followed by daily injections of 5 mg. of progesterone for five days. In many cases a few days after the injections have been discontinued bleeding sets in. By this method, which is rather commonly used, the patient receives during one month of treatment at least thirteen injections. We find that this circumstance considerably accentuates the inferiority complex of which these women complain. For many years amenorrheic women have been treated in the manner described, i. e. they received parenterally from 30 to 40 mg. of estradiol benzoate a month, followed by from 30 to 40 mg. of progesterone.

The following observation² indicates that large quantities of estrogens are fully dispensable in the treatment of amenorrhea. If a normally menstruating woman receives in the early postmenstrual stage 10 mg. of progesterone³ daily for five days, another bleeding appears in from sixty to seventy-two hours following the last injection. This bleeding occurs in the intermenstruum and has therefore been designated as "intra-cyclic bleeding." Biopsy shows that the bleeding originates from a thin mucous membrane, with only a

1. Kaufmann, C.: Zentralbl. f. Gynäk 56: 2058 (Aug. 20) 1932; Klin. Wchnschr. 12: 1557 (Oct. 7) 1933.

2. Zondek, Bernhard, and Rozin, Samuel: J. Obst. & Gynaec. Brit. Emp. 45: 918 (Dec.) 1938; ibid. 46: 736 (Aug.) 1939. Zondek, Bernhard, and Rozin, Samuel, and Vesell, Morton: Am. J. Obst. & Gynec. 40: 391 (Sept.) 1940.

3. 1 mg. = 1 international unit.

few glands in the intermenstrual stage. This demonstrates the belief that a previous complete proliferation of the uterine mucosa by estrogens is necessary for the provocation of bleeding by progesterone to be erroneous.

These observations were utilized for the treatment of amenorrhea. It was surprising to find that a five day treatment with a total dose of 50 mg. of progesterone alone was sufficient to produce bleeding in amenorrheic women and that, therefore, the preparatory treatment with estrogens was quite superfluous. A further proof that the bleeding takes place from a very thin, hardly proliferated mucous membrane is shown by the fact that several successive bleedings can be induced in amenorrheic women if the progesterone treatment is repeated after an interval of two to three days. In this short interval only a minimal proliferation of the uterine mucosa can take place. This slight stimulus seems, however, to be indispensable. I have never succeeded in inducing bleeding with progesterone alone in women with primary amenorrhea or with castration amenorrhea.

Simplified Treatment of Amenorrhea

	Hormone Treatment		Duration of Treatment, Days	Number of Treated Cases	Uterine Bleeding	
	Progesterone, Total Dose	Estradiol Benzoate, Total Dose			Number of Successful Cases	Percentage of Positive Results
Secondary	50 mg.	.	5	20	18	90
	50 mg.	..	2	7	6	85.7
	50 mg.	.	1	4	1	25
	25 mg.	5 mg.	2	17	11	64.7
	25 mg.	5 mg.	1	8	4	50
	50 mg.	25 mg.	58	6	6	100
Primary	50 mg.	25 mg.	58	6	6	100

The omission or, as will be seen, the limitation of the use of estrogen in the treatment of amenorrhea has the following advantages:

1. The detrimental effect on the gonadotropic function of the anterior pituitary is avoided, since progesterone, as far as is known, has no injurious effect on the anterior pituitary lobe.
2. The duration of treatment is shortened (from two to five days instead of twenty-five) which is psychically important to the woman. Since pregnen-in-on-ol⁴ given orally has the same effect as progesterone given parenterally, the same results may thus be obtained in a simple five day treatment with a few tablets. It is possible with 300 mg. of pregnen-in-on-ol to obtain an intracyclic bleeding in normally menstruating women.⁵ In secondary amenorrhea bleeding can also be produced with pregnen-in-on-ol. This dose is the minimal dose for a five day treatment.
3. Any possible carcinogenic influence is eliminated.

Our simplified method employed for the treatment of amenorrhea follows.

SECONDARY AMENORRHEA

(a) Treatment for From Two to Five Days With Progesterone Alone.—To the present time, 20 patients with secondary amenorrhea have been treated with progesterone alone. The patients were aged from 18 to 40 years and the amenorrhea had lasted from four months to seven years. A hypoplastic uterus was found in most instances. In 18 out of the 20 patients bleeding

was obtained, i. e. 90 per cent of success. The patients regarded the bleeding in every respect as a regular menstruation, and the subjective symptoms have readily improved. The blood taken from the uterus did not coagulate.

Of the 18 successful cases, 9 could be followed up. In 4 of these cases no further bleeding took place, while in 5 cases further bleedings set in—however, not more than three times. One patient became pregnant. Thus it can be seen that a certain influence on the menstrual cycle is obtained. This mode of treatment does not, however, represent a stimulation therapy but mainly a substitutional therapy, since in half of the cases only a single bleeding followed.

The duration of treatment can be further reduced. Seven patients aged from 18 to 36 years whose amenorrhea had lasted from six months to six years had received 25 mg. of progesterone a day for two days. In 6 of the 7 patients a bleeding set in in from seventy-two to one hundred hours after the last injection. The treatment was successful in 85.7 per cent of the patients. If the 50 mg. of progesterone was given in one injection, no bleeding was obtained. A reduction in the total dose of progesterone is not possible, since bleeding does not take place with smaller doses. The minimal dose, therefore, is 50 mg. From these results one may deduce that the bleeding effect depends on two factors: (a) the dose of progesterone (50 mg. minimum) and (b) the duration of treatment (two days minimum).

(b) Reduction of the Progesterone Dose by Addition of Estrogens.—We made the interesting observation that the progesterone dose, minimum of 50 mg., may be reduced if the estrogen level in the body is increased. Seventeen women who had been amenorrheic for from six months to nine years were treated with 5 mg. of estradiol benzoate and 25 mg. of progesterone⁶ on two consecutive days (2.5 mg. of estradiol benzoate and 12.5 mg. of progesterone daily). From eighty-four to one hundred and twelve hours after the last injection 11 patients reacted with uterine bleeding that lasted for from three to five days; 6 patients did not react at all. This led us to inquire into the probable cause of these failures. We found that the majority of nonreactors had amenorrhea of more than two years. It seems, therefore, that secondary amenorrhea of more than two years' duration should be treated with the full amount of 50 mg. of progesterone. The positive results (64.7 per cent) obtained will probably improve when the two day treatment is used only in cases of amenorrhea of less than two years' duration. When these patients were treated with estrogens and progesterone in one day instead of two days our results were very poor. Only 50 per cent of the patients reacted. We shall, therefore, continue with the two day treatment.

These results indicate that it is possible to reduce the duration of the treatment of secondary amenorrhea from four weeks to a very short time, as shown in the accompanying table. The method of choice is the "five day treatment" with 50 mg. of progesterone (10 per cent failure). The treatment can be further reduced to two days if 25 mg. of progesterone is given daily (14.3 per cent failure). If it is desirable to save progesterone, a total of 25 mg. of progesterone may be given

4. Pregnen-in-on-ol is the same as pregnenolone.
5. Zondek, Bernhard, and Rozin, Samuel: Lancet 1: 504 (March 4) 1939.

6 The preparations used in this investigation were Dimen-formon Benzoate and Progestin "Roche Organon," put at our disposal by the Roche Organon, Inc., Nutley, N. J. The two hormones were mixed in one syringe and simultaneously injected intragluteally.

in two days, but an additional dose of from 2.5 to 5 mg. of estradiol benzoate should be added simultaneously. This method should be restricted only to amenorrheas of less than two years' duration. The "one-shot method" is impracticable. Actually, I have gathered the impression that the treatment of secondary amenorrhea should be started with 50 mg. of progesterone; in the further course of the treatment this dosage may be reduced to 25 mg. of progesterone with the addition of from 2.5 to 5 mg. of estradiol benzoate.

PRIMARY AMENORRHEA AND CASTRATION AMENORRHEA

It has already been noted, the five day treatment with 50 mg. of progesterone gives good results in secondary amenorrhea but fails entirely in the treatment of primary amenorrhea. I have seen that in secondary amenorrhea the smallest stimulus for uterine proliferation is sufficient to produce bleeding. Since in primary amenorrhea no estrogenic hormone is produced, it seems reasonable to introduce small doses of this hormone in order to create conditions similar to those found in secondary amenorrhea. The results obtained have proved the correctness of this assumption.

The introduction of estrogens may precede the progesterone treatment or the two hormones may be given simultaneously in the same syringe. Three women aged from 30 to 39 years with primary amenorrhea received during four days from 0.5 to 1.25 mg. of estradiol benzoate a day, i. e. a total of from 2 to 5 mg. On the following five days 10 mg. of progesterone was given daily, a total of 50 mg. From three to four days after the last injection a bleeding of several days' duration took place in all 3 patients. Injections of 0.4 mg. of estradiol benzoate and 10 mg. of progesterone mixed in one syringe and given for five days in a woman aged 34 with primary amenorrhea led to bleeding on the ninth day after the onset of treatment. Two women aged 30, surgically castrated, received during five days a total of 5 mg. of estradiol benzoate and 50 mg. of progesterone simultaneously. Profuse bleedings occurred in both women on the eighth day. Their previous severe general complaints subsided. The duration of treatment (five days) should not be shortened. No bleeding took place in 6 patients with primary amenorrhea treated with estradiol benzoate and progesterone for one or two days.

COMMENT

The examination of the genital organs is not sufficient in determining the cause of amenorrhea; a general examination should be undertaken. An amenorrhea which is, for example, only a symptom in Cushing's syndrome involves different considerations than an amenorrhea occurring in a myxedematous patient. In cases associated with lowered basal metabolism the administration of thyroid is necessary, as has been stressed by R. T. Frank. Thyroid is still being insufficiently used in the treatment of amenorrhea. In cases in which the amenorrhea is caused by disorders of the sexual system, one should attempt to induce bleeding through sex hormones. There is no doubt that the production of bleeding not only relieves the women psychically but also greatly increases their physical well-being.

As has been demonstrated, it is erroneous to think that a progesterone-induced bleeding can take place only

from a mucous membrane estrogenically prepared. In our simplified method the estrogenic hormone has a secondary role, the bleeding being brought about mainly by progesterone. Large doses of estrogens having an inhibitory effect on the anterior pituitary are avoided and the duration of treatment is reduced from four weeks to two to five days. The following are the methods of treatment:

1. In primary amenorrhea and in castration amenorrhea from 0.5 to 1 mg. of estradiol benzoate and 10 mg. of progesterone are mixed in one syringe and given intragluteally daily for five days. The total dose of this five day treatment will be from 2.5 to 5 mg. of estradiol benzoate and 50 mg. of progesterone. A shortening of the duration of treatment (i. e. less than five days) or the use of smaller amounts of progesterone is not possible. Since in primary amenorrhea the introduction of progesterone alone is insufficient, addition of estrogens is absolutely necessary.

2. In cases of secondary amenorrhea 10 mg. of progesterone is given intragluteally daily for five days, making a total of 50 mg. The duration of treatment may be shortened to two days by giving 25 mg. of progesterone daily. A further shortening of duration of treatment is undesirable. If progesterone is to be economized, addition of estrogens is necessary. We have found that it is best to inject in two days a total of 25 mg. of progesterone and from 2.5 to 5 mg. of estradiol benzoate. This is possible only in women with amenorrhea of less than two years' duration. Secondary amenorrhea of longer duration requires 50 mg. of progesterone.

It is interesting to note that the dose of progesterone is a decisive factor in producing bleeding. We found that 50 mg. is the optimal dose. A decrease of this dose reduces the percentage of good results considerably. The duration of treatment is also of importance. When 50 mg. is injected in secondary amenorrhea during two days, 85.7 per cent of the cases gave good results; but the same dose injected in one day reduced the success to 25 per cent. In primary amenorrhea 50 mg. of progesterone—besides the small amount of estrogens necessary—must be injected in five days. One hundred per cent of good results will then be obtained. When the duration of treatment was shortened to two days, no bleeding took place.

The interval between the last injection and the commencement of bleeding varies from seventy-two to one hundred and twenty hours.

SUMMARY

A new simplified method for the treatment of amenorrhea is as follows:

1. For secondary amenorrhea of more than two years' duration, a total of 50 mg. of progesterone distributed over from two to five days.

2. For secondary amenorrhea of less than two years' duration, the same dosage or a total of 25 mg. of progesterone with from 2.5 to 5 mg. of estradiol benzoate distributed over two days.

3. For primary amenorrhea and castration amenorrhea, a total of 50 mg. of progesterone with from 2.5 to 5 mg. of estradiol benzoate distributed over five days.

A further simplification will be possible by the oral administration of pregnen-in-on-ol instead of progesterone.

SYRINGOMYELIA

A CLINICAL EVALUATION

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Accepted concepts consider syringomyelia to be a tumor-like proliferation of glial cells with cavity formation. This involves the central portion of the spinal cord and brain stem. It is dependent on a developmental defect in the evolution of the neural tube permitting the arrest of embryonal cells.

There is some evidence to show that such a concept of syringomyelia is open to question.

Adult glial tissue constitutes the scar tissue of the nervous system. It is found wherever nervous tissue has been destroyed and healing has occurred, except in pyogenic infections. Ewing's work on Neoplastic Diseases¹ may be advisably quoted: "In an important group of cases, a pronounced central gliosis is associated with syringomyelia. Definite histological features of neoplastic growth are lacking. Some regard the process as a true neoplasm, while others consider it a form of inflammatory gliosis. There is no doubt that a pronounced gliosis is occasionally associated with cavity formation. On the other hand, syringomyelia may result from many processes not connected with tumor growth." The unique elongated gliosis with cavity formation does not conform with tumor growth elsewhere in the spinal cord. Here neoplastic tissue normally expands until it produces pressure symptoms in a localized area.

Syringomyelia notably affects the gray commissure, the ventral third of the lateral columns and the bases of the dorsal horns. This represents an area in the center of the cord from a vascular point of view. Ornstein² has made a detailed study and gives an excellent description of the vascular supply to the substance of the cord. This central area receives blood from various radiating vessels. The most important of these are the vessels entering along the dorsal septum and the terminal branches of the ventral spinal arteries. These arteries are of small caliber. Some lie in a transverse plane, while others are longitudinal. Thus the vascular supply to this area of the cord is very meager. Any process which produces a thickening of the arterial walls or impairment of the circulation of the pial vessels on the surface of the cord may cause an ischemia of this area. The lymphatics similarly enter through dorsal routes and supply the central area. Both systems, therefore, offer direct portals of entry for infections and toxic substances to this vulnerable zone.

It is of interest to speculate on the selectivity of syringomyelia for the cervical, upper thoracic and lumbar portions of the cord. A definite relationship exists between the anatomic enlargements of the cord in these areas and the vascular structure. Ornstein has shown that the caliber of the vessels is smaller in the lower cervical area. There is no appreciable increase in the

number of vessels. Therefore one may assume that this area is more pregnable because the vascular supply is relatively less per unit area.

Tauber and Langworthy,³ making india ink preparations of the spinal arteries of cats, demonstrated that the anterior and posterior spinal arteries, derived from the vertebral artery, were the sole source of blood as far caudally as the fifth cervical segment. Below this level the segmental arteries anastomose with the anterior spinal vessels and reinforce the supply of arterial blood. From their experiments they concluded that the circulation where these two systems unite was easily impaired by vascular disturbances and constituted an additional possible factor in the predominance of cavity formation at this site.

These investigators were successful in producing gliosis with cavity formation over several segments by ligation of the ventral half of the spinal cord of cats. Ligation of the dorsal half resulted in local necrosis in the area of the ligature. The difference may be due to the fact that the ventral ligation involves the circulation to those arteries supplying the greater part of the cord. Likewise they were able to produce central gliosis with cavitation by the injection of necrotizing substances such as 10 per cent dextrose or warm paraffin into the cord.

These experiments—partial ligation of the cord and the injection of necrotizing substances into the cord—illustrate two methods by which cavities may be produced with the formation of glial tissue. The resulting pathologic picture simulates the findings in syringomyelia.

Therefore it is only reasonable to assume that either one or both of these mechanisms may be present in syringomyelia. Certainly infection may cause the thrombosis of small arteries. Infection or toxins, carried to this vulnerable central area by arterial or lymphatic routes, may act as intramedullary necrotizing substances producing gliosis and cavitation.

In clinical neurology syringomyelia is generally regarded as a neoplasm, although many cases have been attributed to the interference of the vascular supply to the cord by a variety of agents. Holmes and Kennedy⁴ in 1908 were among the first to report a case with autopsy material, a case of syringomyelia and syringobulbia secondary to syphilitic pachymeningitis. They expressed the opinion that the intraspinal disease was secondary to the meningitis and "due in some way to the compression of the cord or to the interference with its blood or lymph circulation." Similar cases have been recorded and the condition is recognized and accepted.

There is ample evidence from the study of such diseases as syphilis, poliomyelitis and heavy metal intoxications to conclude that infectious and toxic agents are capable of entering the central nervous system via perivascular, lymphatic and neural routes.

A review of a series of cases suggests that under certain conditions a focal area of infection may indirectly interfere with the vascular supply to the cord with the resultant syrinx and gliosis.

From the Neurological Service and Second (Cornell) Medical Division, Bellevue Hospital, and the Department of Medicine, Cornell University Medical College.

1. Ewing, James: *Neoplastic Diseases*, Philadelphia, W. B. Saunders Company, 1934.

2. Ornstein, A. M.: *Thrombosis of the Anterior Spinal Artery*, *Am. J. M. Sc.* 181: 654 (May) 1931.

3. Tauber, E. X., and Langworthy, O. R.: *A Study of Syringomyelia and the Formation of Cavities in the Spinal Cord*, *J. Nerv. & Ment. D.* 52: 245 (March) 1935.

4. Holmes, G., and Kennedy, F.: *Two Anomalous Cases of Syringomyelia*, *Brain* 31: 494, 1908.

During the ten year period 1928-1938, 42 cases were diagnosed as syringomyelia in the wards of Bellevue Hospital. Of this group 33 have been selected for study. The remainder were excluded for various reasons; some had not been studied in the neurologic service; in others, controversy of opinion existed with regard to diagnosis. Only those cases were considered in which a complete neurologic examination had been made and the majority of observers agreed as to the diagnosis. Cases were rejected when the diagnosis of intramedullary tumor was not definitely excluded.

In general, the historical facts and the clinical and laboratory data obtained in the series conformed with the accepted picture of the disease. Some of the data merit special consideration. The age of onset ranged from 16 to 51 years. The greatest incidence was in the second and third decades. Seventeen of the cases gave a history of some unusual infection within one year prior to the onset of symptoms. Three cases were related to heavy metal intoxication. Six cases were considered traumatic. Of the remaining 7 cases, no definite data were recorded in the history which would point to any specific etiologic agent. Of these, 1 case (reported in detail) came to operation and showed evidence of an old infectious process. It is of interest that all the cases in which trauma with secondary hemorrhage was thought to play a role in the production of the syringomyelia occurred after the age of 40. All cases in which infection may have been a factor occurred before that age.

Seventeen cases in which syringomyelia may have been caused directly or indirectly by infection will now be considered. In 13 of the 17 cases the onset of signs and symptoms occurred in the extremity nearest the infected area. This is a striking fact. It is acknowledged that the relationship is purely presumptive; on the other hand, to deny that such a relationship exists is equally presumptive.

REPORT OF CASES

Five illustrative cases are now presented:

CASE 1.—J. H., a man aged 23, a messenger, had had bouts of productive cough and night sweats of many years' duration. Seven years before admission to the neurologic service he began to complain of numbness and tingling of the fingers of the left hand. Gradually the hand became weak. The process spread to involve the arm and shoulder girdle to such a degree that he was unable to abduct his arm. An atrophy of the intrinsic muscles of the hand occurred and resulted in contractures of the fingers. A tenotomy was performed three years after the onset in an attempt to correct the deformity. Three years before admission a similar involvement of the right arm occurred to a lesser degree. The lower extremities remained uninvolved.

The patient was thin and appeared chronically ill. Examination of the lungs revealed dulness and crepitant rales at both apexes, more extensive on the left, where there was evidence of cavitation. Chest signs were confirmed by roentgenograms.

Neurologic examination revealed a Horner's syndrome on the left. Extraocular movements were normal except for a coarse nystagmus on lateral gaze. There was atrophy of the muscles of the shoulder girdle and the upper extremities, more severe on the left side. Deep reflexes were absent in the upper extremities, present and equal in the lower. There was no evidence of pyramidal tract involvement. Sensation of pain and temperature was impaired from the third cervical to the third dorsal. Position and vibration sense was impaired in the upper and lower extremities. Trophic changes in the fingernails of the left hand were present.

Laboratory data revealed no significant changes; the blood and the urine were normal. The blood Wassermann reaction was negative. The spinal fluid was of normal pressure and gave no evidence of block, with normal cell count and total protein. The Wassermann and colloidal gold curve were negative.

This was a case of syringomyelia of the upper extremities with the onset and greater involvement on the left side in a patient with bilateral chronic pulmonary tuberculosis with the oldest and most extensive changes at the left apex.

CASE 2.—F. R., a man aged 27, an athletic instructor, had had severe follicular tonsillitis for many years. In 1926, five years before the initial examination, a tonsillectomy was per-

Seventeen Cases in Which Syringomyelia May Have Been Caused by Infection

Case	Type and Site of Infection	Site of Onset of Initial Symptoms and Signs of Syringomyelia
1. J. H.....	Chronic pulmonary tuberculosis of left apex	Numbness of the fingers of left hand
2. A. G.....	Chronic pyelitis	Weakness of left leg
3. L. I.....	Severe sore throats; tonsillectomy	Weakness of left arm
4. R. G.....	Twenty-seven felons in two years	Pain in shoulders
5. H. C.....	Severe sore throats; tonsillitis	Weakness of right arm
6. F. R.....	Severe tonsillitis; pyelitis	Pain over left clavicle
7. D. H.....	Encephalitis	Onset in legs; weakness
8. M. L.....	Tonsillectomy; right mastoidectomy	Numbness in right hand
9. W. L.....	Frequent colds and sore throat	Weakness and numbness of left hand
10. A. F.....	Syphilis	Pain in the right leg
11. J. C.....	Syphilis	Weakness of the left foot
12. J. G.....	Spondylitis, lumbar	Pain in right thigh
13. M. M.....	Spinal syphilis	Numbness in right hand
14. H. C.....	Frequent severe colds	Numbness in both thumbs
15. A. G.....	Tuberculosis of right shoulder joint	Numbness of the right hand
16. T. P.....	Injury to cervical vertebrae; infection of finger on right hand	Weakness of right hand
17. W. R.....	Right acute purulent otitis media; spontaneous discharge of pus behind right ear	Weakness of right arm

Only those infections which were present within a year prior to the onset of the disease are included.

formed. In the same year he noted the onset of a dull aching pain over the left clavicle, which radiated over the left shoulder. Shortly afterward the right shoulder girdle had similar involvement, which extended to the anterior surface of the right side of the chest. Approximately two years later he became aware of a weakness and wasting of the muscles of the upper extremities. One year later the right side of the chest became numb and the right leg became weak. A few months before entering the hospital, the patient noted numbness and shooting pains involving the right side of the face.

General physical examination revealed that the tonsils were absent; there was a moderate enlargement of the cervical lymph nodes. The remainder of the examination was non-contributory.

The neurologic examination showed atrophy and fibrillation of the muscles of the shoulder girdle and the upper extremities. In the lower extremities, signs of bilateral pyramidal tract involvement was demonstrated. Temperature and pain sen-

sation was lost from the third cervical to the seventh dorsal in the upper portion of the cord and in the lower from the second lumbar to the first sacral vertebra.

Laboratory examination showed no abnormalities; the blood and the urine were normal. The spinal fluid was under normal pressure with no evidence of block. The Wassermann and colloidal gold tests were negative.

This was a case of syringomyelia which had its onset in the shoulder girdle of a patient with chronic follicular tonsillitis. The onset of symptoms occurred in the same year in which a tonsillectomy was performed.

CASE 3.—W. L., a man aged 32, a clerk, had an appendectomy at 13, herniorrhaphy at 15 and repair of a rectal fistula at 19. The present illness began three years before his admission to Bellevue at the age of 28, at which time he had a generalized infection which was diagnosed as influenza. Shortly afterward he began to experience tingling sensations in the fingers of both hands, at the same time noticed that he had difficulty in flexing his feet, and later observed that his right foot slapped the ground as he walked. Several months after the onset he discovered that the right leg was smaller than the left. In April 1931 he first noted weakness in the right arm. He believed that the right leg had improved and was stronger. In May 1932, following a severe infection of the upper respiratory tract, the right arm became weaker and weakness of the right leg developed. In January 1932, following another severe respiratory infection, he observed increasing weakness in both arms and legs. He began to have difficulty in swallowing and complained that his tongue felt heavy. Neurologic examination revealed muscular atrophy with fibrillary twitching of the right side of the tongue, some bilateral atrophy of both sternocleidomastoid muscles and difficulty in swallowing. There was weakness of the right arm and leg with moderate atrophy. The deep reflexes were overactive on the right side, and there was a positive Babinski and Hoffmann sign on the right. A segmental sensory defect to pain and temperature was found in the presence of normal tactile, vibration sense from the second cervical to the eleventh dorsal vertebra on the right side. The laboratory data were normal. The spinal fluid was normal. The blood and spinal fluid Wassermann reactions were negative.

A diagnosis of syringomyelia was made. Each exacerbation of symptoms and signs of syringomyelia was preceded by a severe upper respiratory infection.

CASE 4.—W. R., a man aged 49, a waiter, had had a severe middle ear infection eight years before. Pus drained spontaneously from behind the right ear. A year later he began to have pain in the upper midscapular region with partial loss of motor power in the right arm and numbness in the right arm and face. Sensation returned in the face after a period of three years. After a year and a half before the present examination, the pain began to radiate to both shoulders and extend down both arms; there was a well defined weakness of the right arm with a gradual contracture of the right hand. In the course of the next six months the patient experienced paresthesias in the fingertips of the left hand and began to have gradually increasing weakness in both legs, more pronounced on the right.

Neurologic examination showed a right Horner's syndrome, atrophy of the right side of the tongue, deviation of the tongue to the right and atrophy of the small muscles of the right hand, right upper arm and shoulder girdle. There was a spastic paresis of the right leg. The deep reflexes were absent in the upper extremities bilaterally and were present in the lower but hyperactive on the right. A bilateral Babinski reflex was extensor in character. There was a loss of pain and temperature sensation on the right between the second and eighth cervical vertebrae and a loss of posterior column sensation in the right hand. Sensory examination was otherwise normal.

Laboratory data were normal. The blood and spinal fluid Wassermann reactions were negative.

A diagnosis was made of syringomyelia and syringobulbia, severe right middle ear and mastoid infection prior to onset of symptoms in the right shoulder and arm.

CASE 5.—T. C., a man aged 44, Italian, a laborer, had no history of any infections. Illness began about four years before the present examination, with wasting of the small muscles of the hands, shaking of the legs and inability to walk because of spasticity of the legs.

Neurologic examination revealed a spastic paraplegia and weakness of both legs. There was atrophy of the musculature of the arms, including the intrinsic muscles of the hands. The reflexes were absent in the upper extremities and hyperactive in the lower, with bilateral extensor plantar response. Temperature and pain sensation were impaired below the sixth cervical vertebra bilaterally. Vibration sense was diminished on the right; tactile sense was normal throughout.

Laboratory data were normal. The blood and spinal fluid Wassermann reactions were negative.

An exploratory laminectomy was performed in the upper thoracic and lower cervical area. The appearance of the cord at operation revealed that the arteries were engorged and tortuous and led to the following postoperative diagnosis being made: "intrinsic inflammatory cord disease with tortuous engorged vessels and possible internal gliosis."

COMMENT

Thirty-three cases of syringomyelia have been considered. These represent all the cases of syringomyelia in Bellevue Hospital from 1928 to 1938 in which a complete neurologic examination was performed and a definite diagnosis made. In 17 cases it is found that an infection was present within a year of the onset of signs and symptoms of the disease. This infection was unusual in character, severity or duration. In 14 cases the onset of signs and symptoms of syringomyelia involved nerve segments in close proximity to and on the same side as the focus of infection.

It is contended that syringomyelia is not necessarily a neoplasm; that syringomyelia may be caused by infection or toxins through their ability to produce impairment of the circulation of the cord or necrotizing action within the cord.

The review of pathologic and experimental data and the analysis of 13 cases of syringomyelia showing the presence of infection and the relation between the onset of signs and symptoms and the infected area adequately supports this contention.

SUMMARY

1. Experimental work shows that the central portion of the spinal cord, because of the structure of the vascular and lymphatic supply, is vulnerable to infectious agents.

2. Gliosis with cavity formation has been produced experimentally by the ligation of parts of the spinal cord and the injection of necrotizing substances such as 10 per cent dextrose or warm paraffin.

3. Clinical evidence of the disease was recorded of 17 cases of syringomyelia, which may have been related to infection.

4. There is an apparent relationship between the infectious site and the site of the onset of syringomyelia.

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Clinical Notes, Suggestions and New Instruments

HYPERTENSION CAUSED BY UNILATERAL RENAL COMPRESSION

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Renal compression has not been considered a cause of hypertension until recently. Page¹ reported the occurrence of hypertension in experimental animals in which a kidney had been enclosed in cellophane. The cellophane caused a tissue reaction around the kidney which resulted in a fibrous hull. This fibrous hull completely enclosed and compressed the renal parenchyma and caused hypertension in dogs, cats and rabbits.

No case has been reported in the literature in which renal compression of an analogous nature has caused hypertension in man. The following case resembles Page's experimental production of hypertension in animals by renal compression.



Fig. 1.—Bisected cyst and kidney, revealing the intramural position of the kidney.

REPORT OF CASE

History.—D. P., a student aged 18, was examined by a school physician and found to have a blood pressure of 154 mm. of mercury systolic and 102 mm. of mercury diastolic. He had no complaints. On physical examination a large, fluctuant, nontender movable mass could be felt in the right renal region. The patient was unaware of this mass. His mother, when told about the mass, remembered an injury which the boy had sustained at the age of 6 years. He had been struck over the right kidney with a roller skate hurled by a playmate. There was discoloration of the skin over the region of the right kidney. The boy was put to bed for a day. The mother observed no ill effects from this injury. There was no history of urinary symptoms at any time.

Further physical examination revealed an accentuation of the aortic second sound. Vascular changes were not observable in the eye.

The urine was normal. Blood chemistry and morphology were normal.

From the Departments of Genitourinary Surgery and Medicine of Northwestern University Medical School, Chicago.

1. Page, I. H.: The Production of Persistent Arterial Hypertension by Cellophane Perinephritis, J. A. M. A. 113:2046-2049 (Dec. 2) 1939.

When an intravenous urogram was made the right kidney excreted the opaque material in normal time. The right renal pelvis was displaced medially and could not be seen distinctly. The left kidney was normal. A retrograde pyelogram of the right kidney revealed that the kidney had been displaced by compression at its lower and lateral borders. A large area of increased density lateral and below the kidney measuring 14 cm. in diameter appeared to cause the displacement of the kidney. This area of increased density, from its contour and position, suggested a cyst of the kidney.

Operation.—Under ethylene anesthesia a right lumbar incision was made. A large fluctuant mass was exposed. This mass extended from the ninth rib to the crest of the ilium. The mass extended beyond the midline medially. Incision of the cyst released about 800 cc. of chocolate colored fluid mixed with old fibrin. After evacuation of the cyst, a flattened kidney with hard bonelike edges could be felt in the wall of the cyst. Because of the possible association of a malignant growth and hemorrhagic cysts, the kidney was removed.

PATHOLOGY

Gross Appearance (figure 1).—The specimen consisted of a large solitary cyst 14 cm. in the transverse diameter, 18 cm. in the longitudinal diameter and 33 cm. in circumference. The right kidney was enclosed within the medial wall of the cyst. The specimen weighed 338 Gm. after approximately 800 cc. of thin, chocolate colored fluid had been removed. Fatty areolar connective tissue surrounded the renal vein, two renal arteries and the proximal attached 3 cm. of ureter. A capsula adiposa was also adherent to the external surface of the cyst. The cyst was about one third filled with chocolate colored, turbid fluid mixed with dark brown-red crumbs. The firm collagenous wall of the cyst varied from 3 to 4 mm. but increased to 5 mm. over the convex surface of the medial surfaces of the kidney and renal pelvis. The renal capsule was fused with the cyst wall. The kidney was 11.5 cm. long, 6.5 cm. in the transverse diameter and 3 cm. thick. The kidney occupied an intramural position in the medial wall of the cyst. The internal sheath of the cyst covering the convex or lateral surface of the kidney was transformed to irregular cartilaginous and partly calcified plaques varying from 3 to 4 cm. in diameter.

Two renal arteries, from 3 to 4 mm. in diameter, entered the kidney. The inferior artery entered the cyst wall covering the hilus of the kidney ventral to the renal pelvis, while the superior artery entered dorsal to the pelvis. The vessels had thick sclerotic walls and narrow lumens.

The external surface, when separated from the cyst, was smooth. Sectioned surfaces revealed a distinct corticomedullary differentiation. The pale gray cortex was 5 mm. thick. The linear striations were not prominent. The medulla was 12 mm. thick. The pyramids were pale red. There were a few small irregular submucosal hemorrhages in the pelvis. The lining of the major calices, renal pelvis and proximal ureter was smooth.

Microscopic Appearance (fig. 2).—The lateral wall of this cyst was formed by a thickened layer of partially hyalinized collagen-connective tissue. No internal identifying membrane was seen. A few areas of bone formation were present. These have a typical pink matrix, Haversian canals, nutrient vessels and a delicate reticulated marrow structure devoid of hemopoietic elements.

Sections taken through the midportion of the convex surface of the kidney were covered by the wall of the cyst. The delicate fibrous capsule of the kidney was intimately fused with the cyst wall. The kidney capsule was identified by delicate strands of collagen-connective tissue, while the wall of the cyst was similar to that already described. The kidney cortex displayed slight subcapsular interstitial fibrosis and round cell infiltration. The precapillary arterioles in this region were thickened. The arcuate and interlobular arteries in this region exhibited no decided change. Neither did the kidney parenchyma. Sections from the poles of the kidney including the ensheathing wall of the cyst and renal pelvis displayed the following:

The cyst wall, formed by partially hyalinized collagen-connective tissue in which were focal infiltrations of lymphocytes

was intimately adherent to the renal capsule. The latter was more compact and thickened than the capsule described over the convex surface. The subcapsular parenchymal changes in this region were greater than they were on the convex surface of the kidney. Several of the glomeruli were replaced by connective tissue. There was some atrophy of the appertaining tubules, associated with interstitial fibrosis and round cell infiltration. The ventral and dorsal renal arteries entered the kidney through the wall of the cyst and capsule. They had thick walls, formed partly by hyperplasia of the media and subendothelial proliferation of fibroblasts to form thickened intima. The fibroblasts of the thickened intima were growing perpendicular to the media. One such vessel had a slight bluish myxomatous degeneration of the stroma. No evidence of fatty degeneration or calcification was seen. One of these vessels was almost completely occluded by reduplication of the elastic lamina and hyperplasia of the media. The major branches of the renal vein were thicker than normal, and in their walls

have exerted compression on the kidney. The sclerosis and thickening of the blood vessels caused by this compression resulted in hypertension. Removal of the kidney brought the blood pressure to normal.

There were three noteworthy features in this case. The factor of age was eliminated as a cause of hypertension. Evidence of infection which might have caused renal damage was not found. The blood pressure promptly returned to normal after nephrectomy. The pathologic and clinical observations closely simulate the experimental hypertension produced in animals by cellophane perinephritis

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Special Articles

SURGICAL EXPERIENCE AT PEARL HARBOR

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The attack on Pearl Harbor began about 7:50 a. m. on Sunday, Dec. 7, 1941, and shortly thereafter with several civilian surgeons from Honolulu I began operating at a large military hospital. The following is a brief account of some of the major surgical situations encountered in the period between December 7 and January 2:

NATURE OF CASUALTIES

The casualties were numerous, varied and severe. The majority were the result of bombing or machine gun attack. The embedded foreign bodies were of variable size and depth. Several casualties were of the most unusual type; such, for example, as an arteriovenous aneurysm at the carotid bifurcation. Also a machine gun bullet lodged in the spinal canal at the second lumbar level. The majority of the casualties consisted of multiple lacerated wounds and compound comminuted fractures. Intrathoracic cases did extremely well; but the intra-abdominal group furnished the largest mortality. There were relatively few intracranial cases, but peripheral nerve injuries were numerous. Loss of limbs, initial or from operation, resulted in only a few postoperative fatalities. Shock and hemorrhage were common, but these were surprisingly well combated by transfusion of blood or liquid plasma. Burns were very rare in our formation; elsewhere they were the major group but fortunately most of them were of the first degree and second degree variety.

PROCEDURE

On arrival, the wounded were triaged (sorted) and given preliminary sedation of $\frac{1}{2}$ grain (0.03 Gm.) morphine when indicated. Previously all the wounded had received the standard tetanus toxoid inoculations on entry into the service. However, when any extensively muscled area was involved or in regions grossly contaminated, an additional 1 cc. of tetanus toxoid was given. Shock was treated by transfusion of whole blood or liquid plasma or by infusion of saline-dextrose solution.

Anesthesia was usually by gas-oxygen-ether sequence, the induction often preceded by intravenous evipal or pentothal sodium. The last named agents were often used throughout and in some cases were administered through a puncture into the transfusion or infusion tubing close to the bend of the elbow. Very few spinal, rectal or local anesthesia procedures were undertaken.

Authorized for publication by the Office of the Surgeon General, U. S. Army.



Fig. 2.—Hyperplastic sclerosis and stenosis of small branch of the anomalous renal artery.

were small arteries which had undergone the same hyperplastic thickening as that described. The mucosa of the major calices and renal pelvis was intact. The edematous subepithelial zone contained a few small hemorrhages. The proximal ureter was normal.

The diagnosis was right solitary cyst with intramural kidney, diffuse hyperplastic sclerosis of the renal arteries and secondary heteroplastic ossification of the cyst wall.

The day after the operation the blood pressure was 118 systolic and 78 diastolic; two weeks after the operation the blood pressure was 104 systolic and 62 diastolic, six months later the blood pressure was 110 systolic and 74 diastolic, and ten months later it was 114 systolic and 74 diastolic.

COMMENT

This boy sustained an injury at the age of 6 years which resulted in the formation of a hemorrhagic cyst, resulting in the envelopment of the kidney parenchyma in the walls of the cyst. The walls of the cyst thickened and appeared to

I had arrived in Honolulu on December 3 at the invitation of the Honolulu Medical Society to give a course of lectures on "Traumatic Surgery." By a strange coincidence the second lecture was entitled "Treatment of Wounds, Civil and Military," and this was given on Friday night, December 5, approximately thirty-six hours before the attack. An audience of about three hundred attended, and a large proportion represented the Army and Navy medical personnel. At this lecture, virtually a rehearsal, stress was placed on early adequate cleansing of wounds by soap and water, followed by débridement to fulfil the three criteria of (1) obtaining normal color, (2) bleeding and (3) muscle contraction—all these to be attained by nonsacrificial exsection of any involved tissues. Thereafter absolute hemostasis was advised, to be followed by placing in the wound an adequate amount of a sulfonamide drug, either sulfanilamide or sulfathiazole. No wounds were to be sutured, but instead left wide open or to have nonabsorbable interrupted sutures placed, but not tied until the third day if all went well (primosecondary suture). Heavy plain gauze dressings were to be applied, and splintage added if joints were contiguous. As part of the after-care, 15 grains (1 Gm.) of a sulfonamide drug was to be given every four hours for three days together with needed sedation. No redressings were to be applied for forty-eight to seventy-two hours unless indicated. These were the recommendations and they were based on experience in World War I and also in civil practice. No one then thought that these principles of treatment were so soon to be put to a large scale test in a proving ground only a short distance from the lecture platform.

When we began work on the morning of the attack there was the inevitable confusion caused by the influx of a large number of casualties, but very soon eight operating teams were on duty and most of us operated continuously for eleven hours. We were relieved by another group, and by this time a six hour shift was started; later this became a four hour tour. Most operations were performed by the civilian surgeons at the onset, as the regular hospital personnel were engaged in the essentially important triage shock, ward work and treating the walking wounded so that they might be discharged to duty. I was restored to temporary active duty in the Army Medical Corps as Colonel, Surgical Consultant, soon after the attack began.

Fractures were mainly of the extremities, often multiple and practically all grossly compounded, with retained metallic foreign bodies and débris. Débridement was done as for any wound, and splintage was in a Thomas arm or leg splint, with or without skeletal traction by transosseous wire. No plates were inserted; a few fractures were encircled with stainless steel wire. Plaster of paris casings were occasionally used when the compounding was not severe; otherwise encirclement was purposely not advised.

In the intrathoracic group, after débridement, tight closure was employed around an indwelling tube, which was connected to under water drainage. This gave us excellent results and we had no cases of empyema despite the necessity for later using aspiration in some cases to provide better decompression for hemothorax. Indwelling foreign bodies were not searched for unless accessible. For subsequent search for foreign bodies within the chest, one of the surgical personnel has been advised by me to perfect himself in the technic used by the French surgeon Petit de la Villon in the last war. This consists of a stab wound in the intercostal

space, through which a long thin clamp is introduced, and then this grasps and removes the foreign body under the guidance of the fluoroscopic screen. It is a very dramatic and successful procedure.

The intra-abdominal group were treated by débridement of the original wound or wounds, and then these were packed with a sulfonamide derivative and left unsutured. A separate median laparotomy incision followed, and this was sutured later by the ordinary laparotomy technic. Intestinal perforations were sutured with silk, and no resections were done unless the damage was extreme. All sutured areas were coated with a sulfonamide drug and the same drug was placed within the abdomen. Our mortality in this group was high. In 1 fatal case of my own there were twenty-one perforations of the jejunum and ileum following a machine bullet wound penetrating the left lower abdominal quadrant and lodging under the liver.

The intraspinal group did well and we had 2 successful cases in which a machine gun bullet had lodged within the spinal canal. In 1 of these I would have failed had it not been for the aid afforded by the "locator." This is an electromagnetic induction apparatus about the size of a portable radio and it functions after the manner of a detector of buried metals. It was developed for me by a very clever technician of the New York City Transit System, and I gave it a successful trial at the Reconstruction Hospital Unit of the New York Post-Graduate Hospital just before leaving for Honolulu. This initial demonstration was in the case of a police officer who had been in the bombing incident at the New York World's Fair in July 1939. At this first test of the locator I was able to locate and remove several small metallic fragments from the region of the ankle, and purposely the x-ray films were not used as additional guides. This apparatus is highly sensitive for fragments of iron, steel, brass and copper, as well as for silver and aluminum, and less so for lead. It indicates the foreign body on the surface by a dial and also registers the subsurface depth almost equally well. The wandlike finder or probe can be sterilized and introduced into the wound if necessary. It was by this last named application that I found the aforementioned intraspinal bullet.

On two successive days during a calm period we gave the locator a severe test in our hospital group, and it proved helpful in 22 cases in which operations were performed by the chief of the surgical service and his assistants. The original apparatus is in Honolulu, but another even more responsive has been tested, and soon the device will be available commercially.

The intracerebral group numbered relatively few, and, as is the rule, survival was rare. Our procedure was débridement of soft tissues and bone, gentle intracranial irrigation and limited search for the foreign body. The dura was sutured, with partial closure of the overlying tissues followed by drainage to the bone level.

Amputations were of the "chop" or "guillotine" variety. In certain cases a modification seems permissible in this technic and it will be subsequently described elsewhere. At the end of the "third period" we attached traction straps to the amputation stump and made some patients ambulatory by applying a plaster spica. Into this we fastened the looped wire from a coat hanger and thereto attached the adhesive traction straps. Instead of using the wire transfixion of the olecranon, in one fractured lower humerus we inserted a screw eye into the base of the olecranon and to this attached our traction. It is simple and

efficient, and local anesthesia suffices. Later I intend trying it for leg fractures, inserting the screw eye through the sole into the os calcis.

RESULTS

We had several cases of gas gangrene, and most of these were confirmed by the laboratory, but none showed true *Clostridium perfringens* (*Bacillus welchi*), although many other anaerobes could be identified. A separate gas gangrene ward was established. Under the combined use of (1) secondary débridement, (2) sulfanilamide in the wound and by mouth and (3) x-ray exposures, all patients recovered without amputation. In every case of gas gangrene the wound had been too tightly sutured despite advice to the contrary.

Purulent exudate was practically absent, so much so that it became a subject of universal comment.

We had no cases of tetanus, local or general. The state of well being of the wounded was exceptional after the first few days. Those in need of stimulation were given a transfusion, and we tried to get many of them outdoors, especially the gas gangrene group, so that the wounds might benefit from sunlight exposure in the balmy air of this wonderful climate (average temperature at this season 65-70 F.).

On January 3 in a San Francisco hospital I visited a large group of wounded we had evacuated on Christmas day, and they were all doing exceedingly well. Their condition elicited a special report to headquarters. Hence the follow-up is sufficiently prolonged to permit evaluation of the end-results.

COMMENT

1. A very large number of seriously wounded arrived at a military hospital within a period of five hours.
2. The postoperative mortality was 3.8 per cent.
3. Most of the fatalities were in the intra-abdominal group and among those depleted by shock and hemorrhage.
4. No deaths resulted from gas gangrene.
5. Purulent discharge was almost absent.
6. The results were better than I had ever seen during nineteen months in France when serving with the French, Belgian and American medical formations.

The outcome was dependent on:

- (a) Early receipt of the wounded—within the "golden period" of six hours.
- (b) Preliminary shock treatment.
- (c) Adequate débridement with no primary suturing.
- (d) Use of sulfonamide drugs in the wound and by mouth.

(c) Adequate after-care.

Other factors which aided were:

- (a) Absence of puttees; the incidence of driven-in dirty apparel was thereby lessened.
- (b) Climatic conditions.
- (c) Early hour of the attack; Sunday morning, and the men were clean and were not war worn.
- (d) Few flies.

Our greatest defect was inability to give better pre-operative shock treatment to a larger number of the seriously wounded.

The outstanding features in this initial outbreak of World War II were the morale of the wounded, the unusual skill of the surgeons and the devoted service of the nursing and other hospital personnel.

It is a duty and a proud privilege to pay tribute to those who served, and no directing surgeon ever had better cooperation.

115 East Sixty-Fourth Street.

DIPHTHERIA MORTALITY IN LARGE CITIES OF THE UNITED STATES IN 1940

EIGHTEENTH ANNUAL REPORT

The data for this review have been obtained from the local health officers through the means outlined in the report on typhoid deaths.¹ There was requested from each health department a statement of deaths from diphtheria both among residents and among non-residents for each of the last eleven years, 1930 to 1940 inclusive. The death rates have been corrected on the basis of the 1940 census, provisional estimates for intercensal years having been furnished by the Bureau of the Census. No attempt has been made to correct the number of deaths reported prior to 1935.

Special attention is directed to the use of symbols to indicate those cities in which either (1) all diphtheria deaths were stated to be in nonresidents or (2) one third or more of such deaths were stated to be in nonresidents. Table 11 lists the cities with no death in 1940, table 13 the cities which would be included in such an honor list unless burdened by deaths among nonresidents.

The fourteen New England cities (table 1) report a continued downward trend in the death rate for the group as a whole (0.50 in 1939, 0.23 in 1940); but, in spite of this striking reduction of more than 50 per cent, they have not been able to overhaul the cities of the Middle Atlantic states, which continue to hold first place (table 16). Ten cities (there were but seven in 1939) report no death from diphtheria in 1940 (Bridgeport, Cambridge, Lowell, Lynn, New Bedford, New Haven, Somerville, Springfield, Waterbury, Worcester). It is stated that the two deaths reported

TABLE 1.—Death Rates of Fourteen Cities in New England States from Diphtheria (Including Croup) per Hundred Thousand of Population

	1930	1931	1932	1933	1934	1935	1936	1937	1938	1939	1940
Springfield	0.0	0.0	0.5*	2.1	10.3	15.4	24.9	19.1	31.3	29.6	51.3
New Haven	0.0	0.0	0.4*	0.7†	1.6	7.1	14.2	14.0	22.7	1.6	54.8
Lynn	0.0	0.0	0.4	4.7	13.5	17.0	17.8	17.2	21.7	2.0	44.0
New Bedford	0.0	0.0	0.4	5.0	10.9	16.5	17.0	20.9	22.6	2.1	51.6
Somerville	0.0	0.0	0.4	9.3	5.7	19.7	20.2	21.4	21.5	10.5	37.8
Waterbury	0.0	0.0	1.4	2.4	2.6	17.9	2.0	29.6			
Ipswich	0.0	0.0	2.8	9.4	10.6	16.7	15.5	20.6	31.0	11.3	41.3
Cambridge	0.0	0.0	0.8	0.3	1.2	3.2	8.9	12.9	23.8	25.3	46.7
Worcester	0.0	1.0*	0.7†	3.4	8.6	15.5	14.1	21.3	32.2	10.5	50.3
Bridgeport	0.0	1.3	0.8	1.2	11.8	19.6	23.4	25.3	26.8	1.2	63.9
Boston	0.3†	0.4†	0.7†	1.2†	8.3	20.2	26.7	20.0	26.2	53.7	83.9
Hartford	0.6	0.6†	1.9†	1.1†	5.3	11.9	13.8	25.3	25.1	28.8	47.8
Providence	0.8*	0.4	0.6†	5.1	9.5	15.8	20.1	26.8	0.7	41.2	54.5
Fall River	0.9	2.6	2.4	3.6	12.0	27.5	27.6	24.0	14	50.1	43.8

* All diphtheria deaths were stated to be in nonresidents.

† One third or more of the reported diphtheria deaths were stated to be in nonresidents.

in Providence occurred among nonresidents, there having been but one death among residents in this city since 1935. Lynn, alone among the ninety-three cities, records no typhoid and no diphtheria death during the

The preceding articles were published in THE JOURNAL Sept. 2, 1934, p. 918; April 25, 1935, p. 1269; April 3, 1936, p. 1075; April 20, 1937, p. 1396; May 19, 1938, p. 1621; May 23, 1939, p. 1755; June 7, 1939, p. 1878; May 23, 1931, p. 1766; May 7, 1932, p. 1644; May 23, 1930, p. 1878; May 20, 1934, p. 1755; June 15, 1935, p. 2187; June 13, 1936, p. 2060; June 26, 1937, p. 222; Aug. 6, 1938, p. 524; May 20, 1939, p. 2043 and May 11, 1940, p. 1075.
1. Typhoid in the Large Cities of the United States in 1940, J. A. M. A. 118:222 (Jan. 17) 1942.

past four years (table 12). New Bedford reports no typhoid death for four years, no diphtheria death for three years. Lowell has completed a period of three years with no death from either cause. Springfield has been without a death from diphtheria for four

TABLE 2.—*Death Rates of Eighteen Cities in Middle Atlantic States from Diphtheria (Including Croup) per Hundred Thousand of Population*

	1935-1939	1930-1934	1925-1929	1920-1924	1915-1919	1910-1914	1905-1909	1900-1904	1895-1899	1890-1894
	1940	1939	1938	1937	1936	1935	1934	1933	1932	1931
Rochester.....	0.0	0.0	0.0	0.7	7.5	16.9	12.7	22.1	32.4	32.3
Utica.....	0.0	0.0	0.0	1.2	13.4#	....	....	....	....	....
Erie.....	0.0	0.0	0.0	4.0	5.8	16.8	15.1	17.7	27.1	42.3
Albany.....	0.0	0.0	0.2*	3.0	7.5	12.8	10.4	20.0	31.6	26.9
Elizabeth.....	0.0	0.0	0.6†	4.5	13.2	19.2	19.3	14.8	51.7	42.4
Yonkers.....	0.0	0.0	0.3	0.6	10.4	17.0	17.7	25.3	....	....
Trenton.....	0.0	0.0	0.8	2.7	4.4	7.3	8.8	12.8	15.8	23.6
Paterson.....	0.0	0.0	0.9	6.3	9.1	18.5	13.5	16.1	25.5	52.9
Philadelphia.....	0.0	0.1	0.5	1.3	11.8	16.7	22.7	24.6	34.1	50.0
Newark.....	0.0	0.2	0.2	3.0	14.5	9.7	14.6	23.3	30.1	46.7
Syracuse.....	0.0	0.5	0.2†	0.4†	2.0	22.9	12.9	16.6	17.4	17.7
Camden.....	0.0	2.5†	2.7	8.1†	21.9	20.3	23.2	38.8	48.9	52.6
New York.....	0.1	0.3	0.6	2.2	10.7	14.0	21.8	28.0	40.0	55.0
Buffalo.....	0.2	0.3	0.8†	4.9	9.1	24.0	27.3	22.0	18.4	24.8
Seranton.....	0.7†	0.0†	0.7	1.7	11.7	12.3	22.1	23.4	....	....
Pittsburgh.....	0.7	0.4	1.3	5.1	11.5	20.1	22.3	29.3	20.4	36.9
Reading.....	0.9	7.2	2.5	3.6	7.3	21.1	16.9	35.7	29.2	70.1
Jersey City.....	2.6	2.0	2.4	6.0	11.5	18.4	21.0	23.2	32.6	57.9

* All diphtheria deaths were stated to be in nonresidents.
† One third or more of the reported diphtheria deaths were stated to be in nonresidents.
‡ Diphtheria deaths from Chapin's Municipal Sanitation.
§ Incomplete data.
¶ Diphtheria data furnished by Pennsylvania Department of Health, Harrisburg.

TABLE 3.—*Death Rates of Ten Cities in South Atlantic States from Diphtheria (Including Croup) per Hundred Thousand of Population*

	1935-1939	1930-1934	1925-1929	1920-1924	1915-1919	1910-1914	1905-1909	1900-1904	1895-1899	1890-1894
	1940	1939	1938	1937	1936	1935	1934	1933	1932	1931
Miami.....	0.0	0.6*	2.2†	3.5	5.4#	....	....	....	....	....
Wilmington.....	0.0	1.8	1.6	6.2	10.9	11.6	15.2	18.0	27.8	50.9
Baltimore.....	0.3†	1.0†	1.0†	1.7	7.6	11.4	13.5	14.2	16.1	33.0
Washington.....	0.5	0.8†	2.8	3.7	7.1	10.5	11.9	6.9	11.2	23.5
Atlanta.....	0.7†	3.3†	4.6†	5.9†	7.0	13.3	10.1	12.5	14.2	11.1
Richmond.....	1.0†	2.6†	1.7†	3.5†	6.9	9.8	5.8	7.0	9.8	24.4
Norfolk.....	1.4	3.1*	2.4	4.0	4.1	4.3	4.1	6.7	17.0	....
Jacksonville.....	1.7†	1.3†	2.4	5.5	6.0#	....	....	....	....	....
Tampa.....	1.8	2.8†	3.1†	4.0	4.6	5.2	9.5#	....	....	....
Charlotte.....	2.0†	7.0†	6.0†	4.1	....	....	....	....	....	....

* All diphtheria deaths were stated to be in nonresidents.
† One third or more of the reported diphtheria deaths were stated to be in nonresidents.
‡ Incomplete data.

years, without a typhoid death for two years. Furthermore, it is stated that no diphtheria death has occurred in a resident of Springfield during the past eight years. New Haven reports no diphtheria death for three years. Boston records two deaths in 1940, one among residents. Of eighteen deaths that occurred in this city during the five years 1936-1940, eight were among nonresidents. For these same five years, Hartford reports ten deaths with but two among residents. One of these resident deaths occurred in 1940. The health officer states that about 82 per cent of entering school children have already received their diphtheria protection treatments.

The eighteen cities in the Middle Atlantic states (table 2) continue to hold first place, with a group rate of 0.20 (it was 0.37 in 1939). The new rate represents a new all time low, but the cities of the New England group are not far behind. In 1939 there were forty-nine deaths and in 1940 but twenty-six. Twelve cities (there were nine in 1939) report no diphtheria death

in 1940. Eight cities (Albany, Elizabeth, Erie, Paterson, Rochester, Trenton, Utica, Yonkers) record no death for two years or more (table 10). Six cities (Camden, Erie, Newark, Rochester, Utica, Yonkers) report no typhoid or diphtheria death in 1940 (table 12). It is stated that in Utica there has occurred no diphtheria death during the past seven years, during which time no typhoid death has occurred among residents and but two typhoid deaths among nonresidents. Rochester and Erie report no diphtheria death for six years; Elizabeth none in four years and but one among residents in eight years. Syracuse records but one diphtheria death (in 1939) and no typhoid death among residents during the five years 1936-1940. There were, however, three typhoid deaths and one diphtheria death among nonresidents during this period. The birth certificate form used in Syracuse provides space for the name of the physician who is to assume medical

TABLE 4.—*Death Rates of Nineteen Cities in East North Central States from Diphtheria (Including Croup) per Hundred Thousand of Population*

	1935-1939	1930-1934	1925-1929	1920-1924	1915-1919	1910-1914	1905-1909	1900-1904	1895-1899	1890-1894
	1940	1939	1938	1937	1936	1935	1934	1933	1932	1931
Grand Rapids.....	0.0	0.0	0.2	0.7	2.0	19.6	13.5	20.0	26.6	17.2
Canton.....	0.0	0.0	0.7	1.7	2.9	17.5	15.1#	....	....	....
Youngstown.....	0.0	0.0	0.7	3.3	10.5	18.5	11.9	40.5	33.5	28.0
South Bend.....	0.0	0.0	1.0	1.3	....	....	....	....	....	....
Toledo.....	0.0	0.0	1.1	2.7	7.2	22.4	14.1	25.4	20.4	56.8
Akron.....	0.0	0.0	1.8	2.7	4.9	10.4	18.0	27.8	21.8#	....
Fort Wayne.....	0.0	0.0	1.9	4.0	5.1	13.1	6.3	....	....	....
Peoria.....	0.0	0.0	3.8	5.3	4.9	7.4	10.8	10.6	10.9#	14.0
Flint.....	0.0	2.0	2.8	2.7	4.5	29.9	25.5	12.7	11.0	16.8
Cleveland.....	0.1*	0.1	1.0	2.5	15.3	14.7	20.0	24.6	20.8	42.6
Detroit.....	0.2	0.4	1.1	5.2	19.7	23.2	33.2	33.2	32.6	38.5
Milwaukee.....	0.3	0.0	0.4	2.1	8.5	11.4	19.3	27.8	26.4	22.7
Gary.....	0.9	0.0	2.8	1.4	....	....	....	....	....	....
Cincinnati.....	0.9	2.0†	2.4†	3.1	5.2	10.6	13.2	13.9	17.0	17.3
Evansville.....	1.0	1.0	1.8	3.5	3.7	13.9	14.9	16.1	21.2	13.8
Chicago.....	1.1	1.6	2.2	4.5	11.7	17.5	31.2	37.9	27.0	33.9
Dayton.....	1.4†	3.3	4.3	3.6	4.6	9.4	9.3	22.1	13.3	17.2
Columbus.....	1.6	0.6	1.9	3.2	4.6	8.5	7.6	12.1	10.5	11.6
Indianapolis.....	2.6†	1.8	3.6	2.9	6.6	11.7	21.4	13.5	13.3	15.9

* All diphtheria deaths were stated to be in nonresidents.
† One third or more of the reported diphtheria deaths were stated to be in nonresidents.
‡ Diphtheria deaths from Chapin's Municipal Sanitation.
§ Incomplete data.

TABLE 5.—*Death Rates of Six Cities in East South Central States from Diphtheria (Including Croup) per Hundred Thousand of Population*

	1935-1939	1930-1934	1925-1929	1920-1924	1915-1919	1910-1914	1905-1909	1900-1904	1895-1899	1890-1894
	1940	1939	1938	1937	1936	1935	1934	1933	1932	1931
Louisville.....	0.6	1.6	2.2	6.2	4.6	10.4	9.5	9.0	....	39.0†
Birmingham.....	0.7†	1.3*	3.1†	4.4	5.4	5.3	7.2	8.3	6.2	13.4
Chattanooga.....	0.8	6.3	4.0	6.8	5.9	8.7	8.9	....	....	....
Knoxville.....	0.9*	2.7†	8.2†	10.0	6.3	11.2	....	....	....	....
Memphis.....	1.7†	0.3*	2.2†	6.0	5.8	9.5	11.2	11.9	13.4	0.9
Nashville.....	1.8	3.0†	4.5†	8.0	11.8	8.0	8.9	7.3	10.3	13.9

* All diphtheria deaths were stated to be in nonresidents.
† One third or more of the reported diphtheria deaths were stated to be in nonresidents.
‡ Diphtheria deaths from Chapin's Municipal Sanitation.
§ Incomplete data.

supervision of the infant. With such information the health department initiates a series of communications to parents and family physicians, timed to stimulate interest in providing protective treatments when the child is about 9 months old. Albany records no death among residents in six years (one among nonresidents in 1937). Buffalo reports one death in 1940; a continuous program of prevention with the aid of private physicians, pediatricians and child health stations. In Jersey City there were eight deaths, seven among

residents. New York reports ten deaths (twenty-six in 1938, twenty-two in 1939), all among residents. It is stated that in six of the thirty health center districts, with populations ranging from 140,000 to 320,000, there have been no deaths from diphtheria during the past three years, and one of these districts with an estimated

TABLE 6—Death Rates of Nine Cities in West North Central States from Diphtheria (Including Group) per Hundred Thousand of Population

	1935-1939	1925-1929	1915-1919	1905-1909	1895-1899	1890
	1940 1939 1938 1937 1936 1935	1924 1923 1922 1921 1920 1919	1914 1913 1912 1911 1910 1909	1904 1903 1902 1901 1900 1899	1894 1893 1892 1891 1890 1889	
Duluth	00 00 02 04 20 60	10 2 6 10 2 8	8 8 38 2 29 1	7 6 49 5		
St. Paul	00 00 02 10 52 175	20 7 31 4 31 1	27 9 43 3 70 4			
Des Moines	00 00 15 43 53 151	16 6 15 1 23 8				
Kansas City, Mo.	00 02 09 33 47 144	22 8 15 7				
Minneapolis	06 02 06 17 11 9	13 4 19 9 28 3	24 4 44 6 34 0	20 0		
Wichita	09 00 12 57 42					
St. Louis	10 17 24 48 103 161	24 4 23 7 19 4	43 3 62 9 67 7			
Kansas City, Kan.	16 00 16 35 46 98	23 1 12 4				
Omaha	18 09 14 51 64 229	35 8 15 8 24 5	20 5 28 2 82 9			

† One third or more of the reported diphtheria deaths were stated to be in nonresidents
Incomplete data

TABLE 7—Death Rates of Eight Cities in West South Central States from Diphtheria (Including Group) per Hundred Thousand of Population

	1935-1939	1925-1929	1915-1919	1905-1909	1895-1899	1890
	1940 1939 1938 1937 1936 1935	1924 1923 1922 1921 1920 1919	1914 1913 1912 1911 1910 1909	1904 1903 1902 1901 1900 1899	1894 1893 1892 1891 1890 1889	
Oklahoma City	05 05 20 57 109					
Fort Worth	06* 06* 39 72 108	17# 26# 26 28 54				
Houston	10 08 26 56 82 64	61 78 105 42# 24 18				
El Paso	10 31 47 83 73 200	176 292				
Dallas	24 31 46 100 98 83	74 69 81 109 160 218				
New Orleans	24 39† 43† 55 85 65	116 196 102 115 171 51 3				
San Antonio	36 12 41 57 103 77	87 67 76 171 206 44				
Tulsa	42 07 17 68 125 83#					

* All diphtheria deaths were stated to be in nonresidents
† One third or more of the reported diphtheria deaths were stated to be in nonresidents
Incomplete data

140,000 population has recorded no death during the past five years. Philadelphia, with no death in 1940, has joined the honor roll (table 11). Pittsburgh reports five deaths (three in 1939), four among residents.

For the nine cities of the South Atlantic states (table 3) which have been included in previous reviews, the local health officers report seventeen deaths from diphtheria in 1940, compared with forty-one in 1939. The rate for the group as a whole has declined from 1.52 in 1939 to 0.62 in 1940. The rate is now lower than that of the East North Central group (0.72) and the West North Central (0.66). Charlotte has been included in the group for the first time; however, for purposes of adequate comparison, the figures for this city have been omitted in calculating rates for the group as a whole. Two cities (Miami, Wilmington) report no death in 1940, and five other cities (Atlanta, Baltimore, Charlotte, Jacksonville, Richmond) record one third or more of deaths among nonresidents. While in 1939 four of the original cities (five with Charlotte) had rates in excess of 20, there was no such city in 1940. Atlanta records two deaths, one among nonresidents; Baltimore three, two among nonresidents. In January 1941 the health officer of Baltimore stated that for the second time (previous interval, September 1934 to October 1935) an unbroken year had passed without the occurrence of a death from diphtheria in a resident; however, the interval has not coincided in either instance with a calendar year. Jacksonville

reports three deaths in 1940, two among residents; Richmond records two, one among residents. It is stated that in Tampa there were two deaths, in Washington three deaths, all among residents.

To the eighteen cities previously included in the East North Central group (table 4) has been added Gary, but again the figures for this city have been omitted in the tables for group comparison. The number of deaths has decreased from ninety-three to sixty-eight, the rate from 0.99 to 0.72 (table 16). In 1937 there was no city among the eighteen on the honor roll. In 1938 there were six (all remaining in 1939); in 1939 there were nine (all but one remaining in 1940); in 1940 there were nine (Akron, Canton, Flint, Fort Wayne, Grand Rapids, Peoria, South Bend, Toledo, Youngstown). Eight cities (Akron, Canton, Fort Wayne, Grand Rapids, Peoria, South Bend, Toledo, Youngstown) record no death for two years or more (table 10). Six cities (Canton, Fort Wayne, Grand Rapids, Peoria, South Bend, Youngstown) report no typhoid or diphtheria death in 1940 (table

TABLE 8—Death Rates of Twelve Cities in Mountain and Pacific States from Diphtheria (Including Group) per Hundred Thousand of Population

	1935-1939	1925-1929	1915-1919	1905-1909	1895-1899	1890
	1940 1939 1938 1937 1936 1935	1924 1923 1922 1921 1920 1919	1914 1913 1912 1911 1910 1909	1904 1903 1902 1901 1900 1899	1894 1893 1892 1891 1890 1889	
Long Beach	00 00 04 08 26 104#					
Salt Lake City	00 07 10 13 101 125	145 151 342 460 148 467#				
Tacoma	00 09* 04* 39 93 124	77#				
Denver	03 31 33 39 80 232	67 102 208 296 271 102				
Seattle	05 03 04 04 14 66	55 52 125 134# 272				
Spokane	08 06 06 07 75 113	42 76 258	181			
San Francisco	09 11 10 12 46 230	170 92 144 442 216 418				
San Diego	10† 10† 23 29 66 122	105 80 58 24				
Los Angeles	11† 17 25 52 70 144	71 75 155 254 558 460				
Portland	13 00 03 13 64 113	60 123 122 202				
Oakland	20 06 25 20 74 188	81 103 161 291				
Sacramento	57 19 31 41					

* All diphtheria deaths were stated to be in nonresidents
† One third or more of the reported diphtheria deaths were stated to be in nonresidents
‡ Diphtheria deaths from Chapin's Municipal Sanitation
Incomplete data

TABLE 9—Two Cities with Highest Diphtheria Rate for 1940

Sacramento	57
Tulsa	42

TABLE 10—Twenty-Seven Cities with No Diphtheria Deaths in 1939 and 1940

Akron ‡	Long Beach ‡	South Bend ‡
Albany ‡	Lowell ‡	Springsfield ‡
Canton	Lynn ‡	St. Paul
Des Moines ‡	New Bedford ‡	Toledo
Duluth ‡	New Haven ‡	Trenton
Elizabeth ‡	Paterson	Utica *
Elie *	Peoria ‡	Waterbury
Fort Wayne ‡	Rochester *	Yonkers ‡
Grand Rapids ‡	Somerville	Youngstown ‡

* No diphtheria deaths in seven years
‡ No diphtheria deaths in five years
† No diphtheria deaths in four years
‡ No diphtheria deaths in three years

12) Milwaukee, with no diphtheria death in 1939, records two in 1940, one among residents. Fort Wayne reports no typhoid death for six years, none from diphtheria for three; South Bend none from typhoid for five years, none from diphtheria for three. During the five years 1936-1940 there has occurred one death from diphtheria in Grand Rapids and three deaths in Canton. Chicago reports thirty-nine deaths among resi-

dents in 1940 (fifty-six in 1939). It is stated that the Chicago figures do not include deaths among Illinois residents outside of Chicago, such deaths having been allocated to the place of residence. Cincinnati reports four deaths, three among residents; Detroit three, all among residents. Cleveland records no death among

TABLE 11.—Forty Cities with No Diphtheria Deaths in 1940

Akron	Long Beach	South Bend
Albany	Lowell	Springfield
Bridgeport	Lynn	St. Paul
Cambridge	Miami	Syracuse
Camden	New Bedford	Tacoma
Canton	New Haven	Toledo
Des Moines	Newark	Trenton
Duluth	Paterson	Utica
Elizabeth	Peoria	Waterbury
Erie	Philadelphia	Wilmington
Flint	Rochester	Worcester
Fort Wayne	Salt Lake City	Yonkers
Grand Rapids	Somerville	Youngstown
Kansas City, Mo.		

TABLE 12.—Twenty-Four Cities with No Diphtheria and Typhoid Deaths in 1940

Cambridge	Lowell †	Springfield *
Camden	Lynn †	St. Paul
Canton	Newark	Utica
Des Moines	New Bedford †	Waterbury *
Duluth *	New Haven	Wilmington
Erie	Peoria	Worcester
Fort Wayne †	Rochester	Yonkers *
Grand Rapids	South Bend †	Youngstown

* No diphtheria or typhoid deaths in two years.
† No diphtheria or typhoid deaths in three years.
‡ No diphtheria or typhoid death in four years.

TABLE 13.—Four Cities in Which All Diphtheria Deaths in 1940 Were Stated to Be in Nonresidents

Cleveland	Knoxville
Fort Worth	Providence

residents, one in nonresidents. Gary reports one death in 1940 (none in 1939). Of ten deaths in Indianapolis, it is stated that five were among nonresidents.

The cities in the East South Central states (table 5) report a rate of 1.09, compared with 2.14 in 1939, a decrease comparable to that in the South Atlantic group. In 1939 there were twenty-six deaths, in 1940 but fourteen. While there is no city in the area without a death, Knoxville records that the one death in that city occurred in a nonresident. Of thirty-one deaths reported during the quinquennium 1936-1940, nineteen were among nonresidents, illustrative of the heavy burden assumed by some urban centers for their rural neighbors. It is stated by the health officer of Knoxville that in 1940 more than 70 per cent of the preschool children are known to have received their diphtheria protection treatments. Two cities (Birmingham, Memphis) report that one third or more of the deaths occurred among nonresidents (one of two in the former, four of five in the latter). In 1939 three cities of this group reported rates in excess of 2.0, none in 1940. Chattanooga records one death, Louisville two, Nashville three, all among residents.

The nine cities in the West North Central states (table 6) report the same number of deaths (eighteen) in 1939 and 1940 (rate 0.66). While in 1939 there were five cities on the honor roll, in 1940 there were only four such cities (Des Moines, Duluth, Kansas

City, Mo., St. Paul). Duluth reports no diphtheria death during the past five years and no typhoid death for two years. There has been but one typhoid death during the five year period. Des Moines records no diphtheria death for four years. Minneapolis reports three deaths in 1940, Omaha four, all among residents. It is stated that, of eight deaths in St. Louis, seven were among residents.

The eight cities of the West South Central states are the only group to report an increase in the number of deaths (forty-one in 1940, forty in 1939). The

TABLE 14.—Number of Cities with Various Diphtheria Death Rates

	No. of Cities	40 and Over	20 and Over	10 and Over	5 and Over	Under 5	0.0
1890-1894.....	64	52	60	61	62	2	0
1895-1899.....	66	34	53	63	65	1	0
1900-1904.....	68	22	46	64	66	2	0
1905-1909.....	72	3	43	66	71	1	0
1910-1914.....	79	1	36	63	78	1	0
1915-1919.....	84	0	25	62	81	3	0
1920-1924.....	88	0	14	65	86	2	0
1925-1929.....	92	0	1	22	67	25	0
1930-1934.....	93	0	0	0	24	69	0
1935.....	93	0	0	2	17	76	19
1936.....	93	0	0	0	5	69	19
1937.....	93	0	0	0	3	70	20
1938.....	93	0	0	0	3	66	24
1939.....	93	0	0	0	2	59	32
*1940.....	93	0	0	0	0	53	40

* Charlotte, Gary and Sacramento omitted.

TABLE 15.—Total Diphtheria Death Rates for Eighty-Eight Cities, 1923-1940 *

	Population	Diphtheria Deaths	Diphtheria Death Rate per 100,000 of Population
1923.....	31,060,848	4,078†	13.13
1924.....	31,722,841	3,439	10.84
1925.....	32,384,834	3,133	9.67
1926.....	33,046,827	3,106	9.40
1927.....	33,708,820	3,493	10.36
1928.....	34,370,813	3,176	9.24
1929.....	35,032,806	2,738	7.82
1930.....	35,719,180	1,827	5.22
1931.....	35,821,890	1,366	3.81
1932.....	35,916,317	1,191	3.32
1933.....	36,032,205	861	2.38
1934.....	36,166,434	821	2.27
1935.....	36,348,921	771	2.12†
1936.....	36,549,325	551	1.51†
1937.....	36,751,422	571	1.55‡
1938.....	36,956,409	467	1.26‡
1939.....	37,160,779	326	0.88*
1940.....	37,309,215	225	0.60¶

* The five following cities are omitted from this summary because data for the full period are not available: Jacksonville, Miami, Oklahoma City, South Bend and Utica.

† Data for Fort Worth lacking.

‡ The rate for the ninety-three cities in 1935 is 2.13 (population 37,025,179, diphtheria deaths 789). The corresponding rate for 1936 is 1.52 (population 37,241,414, diphtheria deaths 567).

Rate for ninety-three cities in 1937 was 1.55 (population 37,459,329, diphtheria deaths 583).

† Rate for ninety-three cities in 1938 was 1.26 (population 37,680,153, diphtheria deaths 477).

* Rate for ninety-three cities in 1939 was 0.87 (population 37,900,854, diphtheria deaths 330).

¶ Rate for ninety-three cities in 1940 was 0.60 (population 38,060,662, diphtheria deaths 225).

death rate has increased slightly, from 1.97 to 2.00. While there is no city in the area without a death, Fort Worth records that the one death in that city occurred in a nonresident. It is stated that the two deaths occurring in this city during the past two years have both been among nonresidents. Four cities (Dallas, New Orleans, San Antonio, Tulsa) record rates in excess

of 2.0. Dallas reports seven, four among residents; New Orleans twelve, only four among residents; San Antonio nine, seven among residents; Tulsa six, all among residents.

To the eleven cities previously included in the Mountain and Pacific group (table 8) has been added Sacramento, but the figures for this city have been omitted in the tables for group comparison. For the eleven cities the health officers report thirty-nine deaths in 1940 (fifty in 1939). The rate for 1940 (0.93) is lower than that of 1939 (1.20). The group as a whole stands in sixth place. There are three cities (Long Beach, Salt Lake City, Tacoma) with no death in 1940. Long Beach records no death for five years; Tacoma two deaths, both among nonresidents, for the same period. Two cities (Oakland, Sacramento) record a rate for 1940 in excess of 2.0. Oakland reports six deaths, all among residents; Sacramento six, five among residents. Los Angeles records seventeen deaths, nine among residents; Portland four, two among residents; San Francisco six, four among residents. The health officer of the latter city reports a shift in the age incidence of diphtheria toward adults in recent years.

TABLE 16.—Total Diphtheria Death Rates per Hundred Thousand of Population for Ninety-Three Cities According to Geographic Divisions

	Population	Diphtheria Deaths		Diphtheria Death Rates					
		1940	1939	1940	1939	1935-1939	1930-1934	1925-1929	
New England	2,579,152	6	13	0.23	0.50	0.85	2.38	8.34	
Middle Atlantic	13,129,185	26	49	0.20	0.37	0.65	2.50	9.97	
South Atlantic	2,727,985	17	41	0.62	1.52	2.18	3.54	7.37*	
East North Central	9,386,378	68	93	0.72	0.99	1.82	3.66	11.21†	
East South Central	1,286,747	14	26	1.09	2.14	3.37	6.36	6.84	
West North Central	2,716,484	18	18	0.66	0.66	1.33	3.22	7.82	
West South Central	2,048,692	41	40	2.00	1.97	3.85	6.55	9.24‡	
Mountain and Pacific	4,186,039	39	50	0.93	1.20	1.71	2.69	6.28	

* Lacks data for 1925 for Jacksonville and Miami.

† Lacks data for South Bend.

‡ Lacks data for Oklahoma City for 1925 and 1926.

Of the entire ninety-three cities there are none with a rate of 5.0 and over (table 14), although one of the three newly added cities (Sacramento) reports a rate of 5.7. Only one city of the original group, Tulsa (rate 4.2), records a rate in excess of 4.0. The number of cities with no deaths from diphtheria has increased by eight; that is, from thirty-two to forty (there were twenty-four such cities in 1938). For the eighty-eight cities (table 15) for which data are available since 1923, there occurred 225 deaths from diphtheria in 1940, which is by far the lowest of record (326 in 1939; 467 in 1938). The rate for this group of cities is for the second time less than 1.0. The rate for the ninety-three cities is also below 1.0 (0.60). The actual number of diphtheria deaths has decreased by one hundred and one (from 330 to 229). This is a remarkable record.

Intensive protection programs are being carried on in all parts of the country, especially among the pre-school children. The family physician continues to become a more important part of this program and is giving more protective treatments in his own office. The evidence continues to indicate that the protection programs so extensively maintained are resulting in a definite lower death rate from diphtheria. May the good work continue!

THE TRANSMISSION OF CERTAIN INFECTIONS OF RESPIRATORY ORIGIN

A CRITICAL REVIEW

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At this moment, because of the exigencies of the defense situation, a part of our population is being congregated under conditions highly conducive to the spread of respiratory infections. Furthermore, since even in normal times respiratory infections, both major and minor, are probably responsible for the greater part of all illness in every age group,¹ knowledge of the modes of spread of these infections is of unusual importance.

The older or "contact" theory of the spread of respiratory infections seemed to preclude the possibility of direct intervention in the infection cycle. As a result, efforts toward control of these infections have been directed largely along immunologic lines. In spite of the great amount of energy expended in these efforts, they have, on the whole, had little success. On the other hand, the newer or "air borne" hypothesis suggests other means of control as a reward for its demonstration and thus contributes a new approach to the problem of the prevention of respiratory infections.

The contact theory explains dissemination of respiratory infections as entirely one of person to person transfer, either by direct contact or by droplets. That this route of infection does in fact operate has been suggested by clinical observation. Flugge² and his school at the end of the last century showed that bacteria in droplets emitted by coughing could be recovered only at relatively short distances from their point of origin. These findings received apparent confirmation in practice, in the successful use of the so-called method of barrier nursing. By the proper spacing of beds the incidence of cross infections could be reduced; but it was soon discovered that this method did not prevent the spread of such diseases as chickenpox and measles.

The apparent confirmation of the direct contact theory did not satisfy all investigators, and a renaissance of interest in the mode of spread of respiratory infections has appeared in recent years in the work of clinicians and laboratory workers in several countries, among them Trillat in France, Wells and De Lee in this country, and Cruikshank and Allison in England. A synthesis of their findings and those of others gives us a hypothesis which, while it does not invalidate the droplet idea per se, brings into question its relative significance. Stated simply, the indirect or air borne hypothesis postulates that the greatest spread of respiratory infection is produced by small dried droplets floating in air for relatively long times and distances, or by the resuspension of dried droplets in air after they have settled to surfaces such as floors, clothing and bedclothes. This hypothesis has been advanced by three lines of investigation: 1. Surveys of micro-organisms from the upper respiratory tract of man in his indoor environment and laboratory studies on the fate of micro-organisms in simulated room environments

From the DeLamar Institute of Public Health of the Columbia University College of Physicians and Surgeons.

1. Sydenstricker, Edgar. *The Causes of Illness at Different Ages*. Hagerstown Morbidity Studies, VII, Pub. Health Rep. 13:1177 (May 4) 1928. Collins, S. D. *The Incidence and Causes of Illness at Specific Ages*. Milbank Mem. Fund Quart. 13:329, 1935.

2. Flugge, C. *Ueber Luftinfectionen*. *Ztschr. f. Hyg. u. Infectiösk.* 25:179, 1897. *Die Verbreitung der Phtisie durch die Luftform des Bacillus und durch kleine Husten verspritzte Tröpfchen*, D. A. 30:177, 1901.

as well as experimental transmission of virus infections to animals via the air. 2. The development of methods for the identification of individual strains of streptococci by refined serologic technics similar to those previously established for pneumococci, as well as the classification of the diphtheria bacillus into three types, and the application of these means to the study of the spread of the organisms mentioned. 3. The development of several effective control measures based on the assumption that respiratory infections are essentially air borne. Each of these may now be discussed in turn.

LABORATORY STUDIES

Trillat³ since 1909 has studied various aspects of the problem of air borne infection. Among other phases he has investigated the effect of physical and chemical factors on the properties of microbial droplets suspended in air, the transmission of infection to animals by the air borne route and, lately, means for the prevention of air borne infection. For many years when the air borne hypothesis was in an advanced stage of desuetude he was the only laboratory actively interested in the problem. However, the investigations of Wells in this country starting in 1933 furnished the stimulus which is largely responsible for the current interest in this hypothesis. Wells⁴ showed, by means of a centrifuge apparatus which he developed, that when bacteria of the types which produce disease in the upper respiratory tract are sprayed into the air they can be recovered from it for many hours afterward. He also revived a hypothesis of Gordon that some indication of the extent of nasopharyngeal contamination could be obtained by estimation of the number of alpha hemolytic streptococci of the throat found in the air of enclosed places. At Wells's suggestion an extended survey of the distribution of alpha hemolytic streptococci in the air of schools, theaters and a subway was undertaken in New York City with the aid of the air centrifuge (Buchbinder, Solowey and Solotorovsky⁵). Some two thousand five hundred samples were analyzed. It was found that alpha hemolytic streptococci of nasopharyngeal origin were widely distributed in the air of these enclosed places and that their numbers in each type of location varied directly with conditions of occupancy and ventilation. In addition, although beta hemolytic streptococci of group A were relatively rare in "normal" air, forty-six such strains obtained from the air were found to be indistinguishable in several pathogenic properties from a similar number of strains of group A streptococci which had been isolated directly from disease processes.

Since then there have been several studies on methods for the recovery of bacteria from air. Wells⁶ has suggested a simplified technic for bacterial air analysis with the use of the air centrifuge; Hollaender and Dalla

Valle⁷ have developed a combined Petri plate and suction device which they have used in one study on the efficiency of filters and in another on the transmission of bacteria by ventilating systems; and Phelps and Buchbinder⁸ have found that the Petri dish technic alone is suitable for some types of air analysis.

The suggestive findings of the New York City survey led to an extensive laboratory investigation of the fate of streptococci in simulated room environments. It was determined that streptococci artificially sneezed into air settled out geometrically on agar plates at a rate of about 20 per cent an hour, which resulted in a residual population in the air at the end of twenty-four hours of about 0.5 per cent of the initial number capable of settling (Phelps and Buchbinder⁸). After settling had occurred it was found that streptococci died at geometric rates and that they could be recovered from the floor of a dark room for extended periods. Appreciable numbers of organisms were sometimes still alive several weeks after settling from the air (Buchbinder and Phelps⁹). Furthermore it was found by an extended investigation of several pathogenic properties, such as mouse virulence, ability to grow in defibrinated human blood and the fibrinolysis of clotted human blood, that these properties were never more than slightly impaired by room sojourn (Buchbinder, Solowey, Solotorovsky; Buchbinder, Solotorovsky, Solowey and Ruhl-Koupal¹⁰).

Another investigation, whose findings are of significance if the air borne route is important in the dissemination of infection, is one in which the effect of sunlight and daylight on streptococci and pneumococci in a simulated room environment was studied (Buchbinder, Solowey and Phelps¹¹). Although it has been known for a long time that the visible spectrum, particularly the blue region, exerts a bactericidal effect (Downes and Blunt and others¹²) research on the

7. Hollaender, A., and Dalla Valle, J. M.: A Simple Device for Sampling Air Borne Bacteria, *Pub. Health Rep.* 54: 574 (April 7) 1939. Dalla Valle, J. M., and Hollaender, A.: The Effectiveness of Certain Types of Commercial Air Filters Against Bacteria (*B. Subtilis*), *ibid.* 54: 695 (April 28) 1939; A Study of the Role of Ventilating Systems in the Transmission of Bacteria, *ibid.* 55: 1268 (July 12) 1940.

8. Phelps, E. B., and Buchbinder, Leon: Studies on Micro-Organisms in Simulated Room Environments. I. A Study of the Performance of the Wells Air Centrifuge and of the Settling Rates of Bacteria Through the Air, *J. Bact.* 42: 321 (Sept.) 1941.

9. Buchbinder, Leon, and Phelps, E. B.: Studies on Micro-Organisms in Simulated Room Environments. II. The Survival Rates of Streptococci in the Dark, *J. Bact.* 42: 345 (Sept.) 1941.

10. Buchbinder, Leon, Solowey, Mathilde; Solotorovsky, Morris, and Phelps, E. B.: Studies on Micro-Organisms in Simulated Room Environments. IV. The Effect of Survival on the Pathogenic Properties of Streptococci, Mouse Virulence, *J. Bact.* 42: 615 (Nov.) 1941. Buchbinder, Leon; Solotorovsky, Morris; Solowey, Mathilde, and Ruhl-Koupal, Jean: Studies on Micro-Organisms in Simulated Room Environments. V. The Effect of Survival on the Pathogenic Properties of Streptococci, Properties Other Than Mouse Virulence, *ibid.* 42: 631 (Nov.) 1941.

11. Buchbinder, Leon, Solowey, Mathilde, and Phelps, E. B.: Studies on Micro-Organisms in Simulated Room Environments. III. The Survival Rates of Streptococci in the Presence of Natural, Daylight and Sunlight, and of the Effect of Sunlight on the Survival of Streptococci, *J. Bact.* 42: 353 (Sept.) 1941.

12. Downes, A., and Blunt, T. P.: Researches on the Effect of Light on Bacteria and Other Organisms, *Proc. Roy. Soc., London* 26: 488, 1877. Ward, H. M.: Experiments on the Action of Light on Bacillus Anthracis, *Proc. Roy. Soc., London* 52: 393, 1892-1893; Further Experiments on the Action of Light on Bacillus Anthracis, *ibid.* 53: 23, 1893; The Action of Light on Bacteria, *ibid.* 54: 472, 1893-1894; Further Experiments on the Action of Light on Bacillus Anthracis and on the Bacteria of the Thames, *ibid.* 56: 315, 1894; The Action of Light on Bacteria. II. *Phil. Tr. Roy. Soc., London*, s. B. 185: 961, 1894.

Arloing, S.: Influence de la lumière sur la végétation et les propriétés pathogènes du bacillus anthracis, *Compt. rend. Acad. d. sc.* 100: 378, 1885. Influence du soleil sur la végétation des spores du Bacillus anthracis, *ibid.* 101: 511, 1885; Influence du soleil sur la végétation, la végétation et la virulence des cultures du Bacillus anthracis, *ibid.* 102: 535, 1885; Les spores du Bacillus anthracis sont réellement tuées par la lumière solaire? *ibid.* 104: 701, 1887. Janowski, T.: Zur biologie der Typhus Bacillen. Die Wirkung des Sonnenlichts, *Zentralbl. f. Bact., u. Parasitenk.* S. 167, 1890. Weinziur, J.: The Action of Sunlight on Bacteria with Special Reference to *B. Tuberculosis*, *J. Infect. Dis.* 1907, supp. 3, p. 128. Larouquette, M.: Expériences sur l'action bactericide de la lumière solaire (lumière blanche totale et lumières partielles ou de couleurs), *Ann. Inst. Pasteur*, 32: 170, 1918.

3. Trillat has had numerous papers published in the Comptes rendus de l'Académie des sciences and in other French journals. His first paper was perhaps in 1909 (Trillat, A., and Santon Action des gaz putrides sur les microbes, *Compt. rend. Acad. d. sc.* 149: 875, 1909). His latest paper is Sur le mécanisme de transmission des maladies transmissibles par l'air et sur les aérosols microbiens, *Arch. Inst. Pasteur Tunis* 29: 294, 1940.

4. Wells, W. F.: Apparatus for Study of the Bacterial Behavior of Air, *Am. J. Pub. Health* 23: 58 (Jan.) 1933, On Air Borne Infection: Study II. Droplets and Droplet Nuclei, *Am. J. Hyg.* 20: 611 (Nov.) 1934. Wells, W. F., and Stone, W. R.: On Air-Borne Infection: Study III. Viability of Droplet Nuclei Infection, *ibid.* 20: 619 (Nov.) 1934.

5. Buchbinder, Leon; Solowey, Mathilde, and Solotorovsky, Morris: Alpha Hemolytic Streptococci of Air. Their Variant Forms, Origin and Numbers per Cubic Foot of Air in Several Types of Locations, *Am. J. Pub. Health* 28: 61 (Jan.) 1938. Buchbinder, Leon; Solotorovsky, Morris, and Solowey, Mathilde: A Note on the Beta Hemolytic Streptococci of Air, *Proc. Soc. Exper. Biol. & Med.* 38: 570 (May) 1938.

6. Wells, W. F.; Phelps, E. B.; Robertson, E. C., and Winslow, C. E. A.: Quantitating Gordon's Bacterial Test for Estimating Pollution of Air, *Am. J. Pub. Health* (supp.) 31: 129, (March) 1941.

lethal effects of sunlight has largely been directed toward the much more potent ultraviolet region of the invisible spectrum. This apparent lack of appreciation of the disinfecting power of visible light may be due in part to the fact, as stated by Duggar,¹³ that in the early days "extravagant claims were made regarding the disinfecting value of even diffuse light of low intensity, and such extreme views were not overcome for a period of years," and in part to the absence of a quantitative technic for the estimation of the admittedly weaker activity of daylight. Indeed, some of the studies on the quantitative germicidal effect of ultraviolet light are subject to criticism in that the organisms were tested under conditions which did not simulate their natural environment. In the present studies the effects of sunlight and daylight which had passed through the glass of a window and the glass covers of Petri plates were tested on streptococci and pneumococci which had settled out of the air into the bottoms of Petri plates. It was found that under these conditions diffuse daylight was a potent lethal agent. Thus 50 per cent of the organisms of a short chained strain of alpha hemolytic streptococcus died in about three quarters of an hour, as did strains of pneumococci of types I, II and III. Likewise it was observed that the 50 per cent lethality zone of strains of group A beta hemolytic streptococci was reached after somewhat longer intervals, which appeared to have been due, in part at least, to the greater chain length of these strains. The lethal effect of daylight was found to be dependent on both quantitative and qualitative factors. Diffuse daylight from blue skies exerted a maximal effect per foot candle, whereas light from gray skies produced a minimal one. The total lethality even under overcast skies, however, was not insignificant. This was so because of increased reflection from the clouds; i. e., the total number of foot-candles available was greater. Direct sunlight through glass under similar conditions was about ten times as potent as diffuse daylight, 50 per cent of the chains of the alpha hemolytic streptococcus strain being killed in about five minutes. Lastly, the now relatively common tubular fluorescent lamp was found to exert a lethal effect per foot candle which was only slightly less than that of daylight. It may be concluded, then, that if the air borne route for respiratory infections is important (1) the concentration in our environment of organisms of the types which cause these infections is reduced by natural daylight and sunlight, and (2) this suggests the planning of a maximum of window space in new hospitals, schools and homes.

Still another field of laboratory investigation which has been barely invaded is that of the mode of spread of virus infections of the respiratory tract. Some suggestive clinical evidence for the air borne transmission of psittacosis to man (McCoy, Stimson¹⁴) and canine distemper to dogs and ferrets (Dunkin and Laidlaw¹⁵) has been adduced. In addition, as will be discussed subsequently, there is indirect evidence that chickenpox virus also travels through the air. However, just as there is little concrete knowledge of the reservoirs for

virus infection so there is little more than this circumstantial evidence for the routes by which virus infections spread. This subject is undeveloped because means for the laboratory study of viruses, unlike those for bacteria, are largely inadequate. Nevertheless some progress has been made. Wells and Brown,¹⁶ by collecting influenza virus with the air centrifuge after spraying, and transferring it to ferrets, were able to recover the virus for thirty but not for sixty minutes. Similarly, Trillat and Beauvillain¹⁷ reported the infection of ferrets exposed to a spray of influenza virus. The first study by a quantitative technic of the settling of virus particles from air has recently been made (Buchbinder and Solotorovsky¹⁸). This was done by exposing the intact chorioallantoic membrane of the developing chick embryo to vaccinia virus sprayed into air, resealing the egg and counting the pocks which developed after three additional days' incubation. It was found that vaccinia virus could be recovered for at least eight hours after being sprayed into the air and that the virus seemed to settle out at a faster rate than did bacteria, a finding which may indicate a more rapid death rate for the virus. This method or some adaptation of it may furnish a useful tool for further study of the general problem of the mode of transmission of virus infections.

In summary, these studies furnish ample experimental basis for the air borne hypothesis. They demonstrate that such common pathogens as the streptococcus and pneumococcus may persist in air and maintain their virulence for relatively long time periods after being sneezed artificially, and that a similar phenomenon, perhaps of shorter duration, may also occur with certain viruses.

CLINICAL STUDIES

Although relatively little study has been made of the manner of spread of streptococcal, pneumococcal and diphtheritic infections in the population at large, infections developing in hospitals may be taken as illustrative of the general problem. Such infections constitute in their own right a serious problem in hospital management. The institutions in which new infections are of the greatest importance are isolation, children's and maternity hospitals. In the surgical and medical wards of general hospitals, as might be expected, the problem is somewhat less important.

New means for the identification of streptococci were furnished by the pioneering efforts of Lancefield¹⁹ in distinguishing those strains infecting man from others and by the systematization of the serologic types causing human disease by Griffith.²⁰ When streptococci of several serologic types are recovered from the air of a room it is now sometimes possible to identify the person or persons from whom each was derived. Likewise studies of the spread of infection, under the special conditions existing in a hospital ward, may provide data on the relative likelihood of direct person to person transfer or of the alternative indirect mechanism.

13. Duggar, B. M.: Effects of Radiation on Bacteria, in *Biological Effects of Radiation*, New York, McGraw Hill Book Company, Inc., 1936, vol. 2, chapter 36, p. 1120.

14. McCoy, G. W.: Psittacosis Among the Personnel of the Hygienic Laboratory, *J. Infect. Dis.* 55: 156 (Sept.-Oct.) 1934. Stimson, A. M. Bacteriological Investigations of the United States Public Health Service, *Pub. Health Rep.*, 1938, supp. 141, p. 48.

15. Dunkin, G. W., and Laidlaw, P. P.: Studies in Dog Distemper, I. Dog Distemper in the Ferret, *J. Comp. Path. & Therap.* 59: 231, 1926; II. Experimental Distemper in the Dog, *ibid.* 59: 213, 1926.

16. Wells, W. F., and Brown, H. W.: Recovery of Influenza Virus Suspended in Air and Its Destruction by Ultraviolet Radiation, *Am. J. Hyg.* 24: 407 (Sep.) 1936.

17. Trillat, A., and Beauvillain: Essai de transmission aérienne de la grippe au furet par voie pulmonaire ou oculaire, *Compt. rend. Acad. sc.* 205: 1186 (Dec. 6) 1937.

18. Buchbinder, Leon, and Solotorovsky, Morris: Studies on Micro-Organisms in Simulated Room Environments, VI. The Diffusibility of Vaccinia Virus from Air, *J. Bact.* 42: 635 (Dec.) 1941.

19. Lancefield, R. C.: A Serological Differentiation of Human and Other Groups of Hemolytic Streptococci, *J. Exper. Med.* 57: 571 (Mar.) 1933.

20. Griffith, F.: The Serological Classification of Streptococci by Genes, *J. Hyg.* 34: 542 (Dec.) 1934.

STREPTOCOCCIC INFECTIONS

Scarlet Fever Wards.—The most significant studies have been carried out in scarlet fever wards of isolation hospitals. In these wards the occurrence of so-called complications is a major problem. As indicated by de Waal,²¹ 28 per cent of more than 2,000 cases studied over a fifteen month period in the Edinburgh Fever

TABLE 1.—*The Relation of the Number of Swabs Taken to the Percentage Incidence of New Serologic Types of Streptococci in the Upper Respiratory Tract of Patients in Scarlet Fever Wards*

Authors	No. of Patients	Per Cent with New Type
Gunn and Griffith	100 ¹	50
Allison and Gunn	200 ¹	46
Allison and Brown	100 ² 47 ³	57 70
Green	1,062 ²	10
White and others..	2,203 ⁴	55
De Waal	254 ⁵ 86 ⁶	76 75

Presence of new type determined by throat swab:

- 1 Weekly during hospitalization
- 2 On discharge from hospital
- 3 Twice weekly during hospitalization
- 4 After 3½ weeks of hospitalization
- 5 After more than 2 weeks of hospitalization
- 6 Daily during entire period of hospitalization

Hospital presented complications which necessitated an estimated fourteen thousand four hundred extra days in the hospital for the patients involved.

It has been found, as was first suggested by Smith,²² that the majority of these complications are actually new infections by a strain of streptococcus serologically distinct from the patient's original one, whose source can usually be traced to some other individual in the hospital, in most instances a fellow patient. Thus a new strain was found to be responsible for the complications in 18 of 20 instances intensively studied by Brown and Allison²³ and in 61.5 per cent (280 of 450) instances reported by de Waal.²¹ Furthermore, it has become evident that the incidence of clinical complications does not furnish complete evidence of the actual spread of streptococci through a ward. A bacteriologic study of all cases, complicated or not, reveals a still higher incidence of new infection, which includes cases in which new serologic types are harbored in the absence of clinical symptoms²¹ (table 1).

In the opinion of several investigators, direct contact between patients via droplets or by more intimate association is the most important route of spread of ward infections. Thus Gunn and Griffith²⁴ found that 13 of 50 patients studied acquired their infection while in bed, whereas 37 did not show a new type until they

were ambulant, from which they concluded that the organisms were spread by the direct mingling of patients. Likewise Allison and Brown,²⁴ from similar observations, came to the same conclusion: "The most frequent mode of transmission of reinfection appears to be by direct contact of patient with patient." De Waal,²¹ whose experience was comparable, was also of a similar although more qualified opinion: "Direct contact seems to play some part in the transmission of streptococci. . . ."

On the other hand, the data of these authors and others contains evidence in favor of the air borne hypothesis. In the first place streptococci can be recovered from the air of scarlet fever wards in relatively large numbers (Vas; Friedemann and Deicher²⁵). Brown and Allison²³ exposed Petri plates to the air of scarlet fever wards at three time intervals during twenty-four hours. Their results indicated that "Hemolytic streptococci are widespread in the ward air and the serological types identified were not confined to the neighborhood of patients infected with a particular type. The degree of infection of air with hemolytic streptococci showed considerable variation during the twenty-four hours. During the night infection was absent or negligible; in the morning there was a steep rise, followed by a slight fall in the degree of infection during the early afternoon. This variation is probably associated with the degree of air movement in the ward produced by the ward staff in the execution of their duties." The number of organisms actually breathed by an individual in such a ward can be determined in a crude way. It can be computed by using a set of data on page 8 of the report of Brown and Allison that in a twenty-four hour period, assuming a settling rate of streptococci from air of 10 inches an hour, approximately thirty thousand organisms might be breathed by each child. The settling rate used is derived from the study of Phelps and Buchbinder⁸ on the settling rates of streptococci artificially sneezed into the air of a quiet room. This value, it may be noted, is likely to be greater in an occupied and busy ward. Nevertheless, even if a settling rate as high as 300 inches an hour is postulated, each child might still breathe one thousand organisms a day.

TABLE 2.—*The Incidence of Throat Swabs Positive for Streptococci on Admission to and Discharge from a Hospital (Green, 1937)*

	Total No. of Cases	0	+	++	+++
Admission . . .	1,875	Cases 294	248	680	654
		Per cent 15.7	12.7	36.7	34.8
				84.3	
Discharge . . .	1,548	Cases 978	259	227	84
		Per cent 63.2	16.7	14.7	5.4
				36.8	

0 = no growth or no streptococci detected on plate; + = less than 10 colonies on plate; ++ = 10 to 20 colonies on plate; +++ = more than 20 colonies per plate.

²¹ de Waal, H. L. The Serological Types of Hemolytic Streptococci in Relation to the Epidemiology of Scarlet Fever and Its Complications, *J. Hyg.* **40**:172 (March) 1940.

²² Smith, J. The Serological Classification of Hemolytic Streptococci Obtained from Cases of Scarlet Fever, *J. Hyg.* **25**:165 (July) 1926; Further Studies on the Serological Classification of Hemolytic Streptococci, *ibid* **26**:420, 1927.

²³ Brown, W. A., and Allison, V. D.: Infection of the Air of Scarlet Fever Wards with Streptococcus Pyogenes, *J. Hyg.* **37**:1 (Jan) 1937.

²⁴ Gunn, W., and Griffith, F.: Bacteriological and Clinical Study of One Hundred Cases of Scarlet Fever, *J. Hyg.* **28**:250, 1928. Allison, V. D., and Gunn, W.: The Epidemiology of Streptococcal Infections, *Proc. Roy. Soc. Med.* **25**:927, 1932. Allison, V. D., and Brown, W. A.: Reinfection as a Cause of Complications and Relapses in Scarlet Fever Wards, *J. Hyg.* **37**:153 (April) 1937. Green, C. A.: The Serological Types of Hemolytic Streptococci in Epidemic Scarletina, *ibid* **37**:318 (April) 1937. White, C.; Rudd, G. V.; Ward, H. K.; Wilson, F. H., and Swington, N. J.: The Serological Types of Hemolytic Streptococci Causing Scarlet Fever in Sydney, N. S. W., Australia, *ibid* **37**:1 (Jan) 1939. de Waal²¹.

The integration of several other groups of data indicates the probability that reinfection with streptococci usually can occur only after a week or more of hospitalization. It is generally agreed that during hospitalization the number of colonies of streptococci isolated on Petri plates from a swab of a patient's throat decreases

²⁵ Vas, B.: Ueber das Vorkommen von Scharlachstreptokokken in der Luft. *Zentralbl. f. Bakt. O.* (Abt. 1) **98**:159, 1926. Friedemann, U., and Deicher, H.: Die Uebertragung des Scharlachs, *Deutsche med. Wchnschr.* **52**:2147 (Dec. 17) 1926.

progressively with time (Gunn and Griffith;²⁴ Keogh, MacDonald, Battle, Simons and Williams²⁵). Green²⁴ has compared the number of positive throats, as well as the number of colonies per positive plate, of groups of more than 1,500 patients on admission to and discharge from a hospital (table 2). Green's data, however, are probably complicated by the fact that a number of the patients were unquestionably reinfected during hospitalization, so that the figures obtained on discharge were probably higher than they would have been if reinfection had not occurred. Perhaps more satisfactory data for analysis are furnished by de Waal,²¹ who studied a series of 30 patients who did not suffer any complications while in the hospital. It is not entirely clear whether this means that no new strains were isolated. De Waal found that the percentage of negative throat swabs taken at the end of each five weeks gradually increased (table 3).

Secondly a series of observations suggests that the presence of one strain of streptococcus in a throat may militate against the implantation of a different strain, at least in scarlet fever wards. Allison and Brown²⁴ observed that during thirteen weeks a total of eleven primary infecting strains were found in a ward at one time or another, an average of about six strains being present during each of the first ten weeks. Neverthe-

TABLE 3.—Comparison by Weeks of the Percentage of Patients with New Types of Streptococci in Throat and Percentage with No Streptococci in Throat in Absence of Complications

Author	Number of New Cases	Per Cent	Swabbed During			
			1st Wk.	2d Wk.	3d Wk.	4th Wk.
Allison and Brown	47	With new types	21	25.5	61.7	70.2
De Waal	30	Negative in absence of complications	3.3	16.3	39.9	66.7

less, of 33 reinfected patients, 21 acquired only one new type, and the remaining 12 acquired from two to four. De Waal states, moreover, that "Once a new type appeared in the throat of a patient, it tended to persist either alone or in conjunction with the original type. When a third type occurred, its appearance was either temporary or, if it persisted, the other types disappeared."

This point is further amplified when the liberty is taken of placing in juxtaposition for purposes of comparison the findings of de Waal and data taken from Allison and Brown. In table 3 de Waal's data on uncomplicated cases, given in terms of percentage incidence by weeks of negative throats, are placed alongside those of Allison and Brown, given as percentage incidence of new serologic types found in the throats in complicated cases during similar periods. It is seen that during the first week almost all the throats are still positive for the original strain and that very few new strains are found. Likewise, during the first week and throughout succeeding weeks a positive correlation is noted between the presence of new strains in complicated cases and that of negative throat swabs in uncomplicated ones. This may be taken as suggesting that, as the incidence of throats still harboring their primary strains decreases, the proportion of throats showing new strains increases.

However, it is also noted that, from the second week onward, the percentages given by Allison and Brown are higher than those of de Waal. If these data may be regarded as comparable, the higher values for reinfection may be explained on the ground that new infections sometimes occur before the original strain disappears from the throat. Such a finding has actually been reported by de Waal:²¹ "In the majority of patients before new strains become established in their throats, a period of some days elapsed during which the previous strain appeared to decrease or die out. In [some] cases, . . . however, one type was suddenly replaced by another."

All these observations may now be summarized as follows: 1. The number of organisms of the original infecting strain present in the throat of a scarlet fever patient tends to decrease with time. 2. Those throats reinfected during hospitalization in most instances show only one new type despite the fact that several are available in the environment. 3. The presence of a strain in the throat in large numbers during the first week of hospitalization seems to be antagonistic to the implantation of a new strain.

Synthesis of these findings suggests that reinfection and the resultant complications could not occur until the second or third week of hospitalization because the patient is not susceptible to reinfection until that time. The recovery of large numbers of streptococci from the air of the wards indicates that probably at most times enough organisms of the proper serologic types are present to account for all the new infections. The findings of Buchbinder and his associates, previously mentioned, on the comparative stability of several pathogenic properties of streptococci in simulated room environments provide grounds for assuming that the pathogenicity of these strains is not lost during their sojourn in man's environment.

According to the air borne theory one would thus ascribe the low incidence of reinfections during the first week of hospitalization to the fact that the presence of the original strain in relatively large numbers in almost all throats during this period would interfere with the implantation of new strains, even in the presence of large numbers of suitable pathogens in the air. The direct contact theory would attribute this initial low incidence to the absence of contact between patients while they were still in bed. Further light may be cast on this point when children not infected with streptococci are placed in a ward in which streptococci are present (Allison²⁷). Nineteen children with measles were admitted to a hospital ward, and on admission 6 of them were found to be carrying streptococci in their throats. One week later 7 of the 13 children whose throats did not yield streptococci on admission were found to be streptococcus carriers, six of these strains being of the same serologic types as those of the children found to be positive on admission to the ward. All these children had remained in bed during the entire week. Thus about half of the streptococcus negative children became positive in one week in the absence of contact. This observation runs counter to the hypothesis that only ambulatory patients are subject to reinfection but is quite compatible with the air borne hypothesis, since the possibility of what might be called antagonism between strains, noticed in the first week in scarlet fever wards, is nonoperative because of the absence of an original streptococcal infection.

²⁶ Keogh, E. V.; MacDonald, Ian; Battle, Joan; Simons, R. T., and Williams, Stanley: Some Factors Influencing the Spread of Scarlet Fever in an Institution, *J. Hyg.* 39:664 (Nov.) 1939. Green²⁴

²⁷ Allison, V. D. Streptococcal Infections, *Lancet* 1:1167 (May 7) 1938.

The fact that most reinfections do not occur before the second or third week despite the large number of organisms in the air at all times is explained on the air borne hypothesis, as previously mentioned, by the occurrence of renewed susceptibility to infection at that time. If the same fact is used to support the direct contact theory, a fortuitous conjunction of renewed susceptibility to infection and opportunity for contact by patients becoming ambulatory at this time must be assumed.

It is of interest that, although Brown and Allison regarded direct contact as most important in the spread of reinfections, they nevertheless concluded that because of the finding of large numbers of streptococci in the air the possibility of infection via the air could not be dismissed. Likewise de Waal considered that not all ambulatory patients acquired their new infections by contact, since "a number of convalescent patients who were going about the ward contracted complications almost simultaneously with type 6 streptococci, and the only source of infection in the ward at the time was an isolated bed patient with rhinitis, from whom type 6 had been isolated." It might be added parenthetically that Okell and Elliot,²⁸ in studying the spread of streptococcal infection in an otorhinologic ward, found streptococci on the inside but not outside surface of a three panel glass screen surrounding 1 patient's bed. They were also able to recover the same strain of streptococcus, however, on Petri plates placed on the floor a few feet outside the screen.

There have been no extensive studies on the possibility of transfer of infection from patient to patient by nurses. Allison and Brown found, as might be expected, that strains of streptococci prevalent in the ward could be recovered at times from the throats of some of the nurses. These authors seem to have made no attempt to assess the importance of the spread of infection through this route. It is known, however, that patients nursed in isolated cubicles show an almost negligible incidence of reinfection as compared with those treated in multiple bed wards. Lichtenstein²⁹ studied two groups of patients, 171 in each, who were so divided, and found that no patients relapsed who were nursed alone or in a double bed ward with another member of the patient's family, who presumably was infected with the same type. In 10 additional cases relapse did occur in the isolation pavilion, but in each instance the relapse occurred in a double bed room, whose occupants were presumably unrelated. In the multiple bed, or control, series there were 21 relapses. Similarly Allison and Brown swabbed 16 patients, nursed in isolated cubicles, twice weekly from admission to discharge. With 1 exception only the primary infecting type of streptococcus was recovered from each of these patients. The exception was a patient who had had two strains on admission, one of which disappeared and later reappeared when the strain presumably responsible for the scarlet fever disappeared. These findings can be taken to indicate that nurse contact, which occurs in both groups, is not an important factor in the transmission of infection.

Streptococcal Infections in Other Hospitals.—The following studies of new infections in other hospitals are not as complete as those which have been discussed.

It is also possible that streptococci may not be as ubiquitous in these places since, unlike the condition in scarlet fever wards, not every patient is primarily infected with streptococci.

Maternity Hospitals: The most important single cause of severe illness in postparturient women is streptococcal infection, and the greatest source of this infection after hospital delivery is the hospital personnel or patients, either directly or indirectly.

Dora C. Colebrook³⁰ has tabulated the findings of several investigators on the streptococcal morbidity and mortality of women entering a hospital because of some complication after delivery. A summary of her tables shows that 49.4 per cent (546 of 1,106) were infected by the streptococcus, that 26.4 per cent (128 of 485) died and that the streptococcus was responsible for 79.5 per cent (128 of 161) of all deaths among the women. She has also estimated that if streptococcal infections after childbirth were prevented there would be 576 less deaths and 2,304 less cases of severe nonfatal illness among mothers annually in England and Wales. In addition Leonard Colebrook³¹ has made the more immediate suggestion that, if what was accomplished by preventive measures in a single London hospital was extended to other institutions, deaths and illness of postparturient women due to streptococcal infection would be reduced by at least one half.

Autoinfection is not the major source of puerperal infection. The first experimental evidence indicating that the major source of infection is external was presented by Kanter and Pilot³² in 1924, and since then the fact has been amply established.³³ Dora C. Colebrook³⁰ has summarized the experience of others, involving several thousand cases, which showed that (1) at various stages before delivery the incidence of streptococci in the genital tract was only between 2 and 3 per cent; and (2) that but few of these streptococcus positive women had any severe febrile experience during the puerperium. The latter finding may be explained by the fact, as shown by Lancefield and Hare, that most of the streptococci in the normal vagina are of the relatively nonpathogenic group B. On the other hand, Rolfs and others³⁴ found group A streptococci in the throats of about 7 per cent of five hundred women on admission to a maternity hospital, which is within the range of that found in the population at large.

Relatively thorough bacteriologic and epidemiologic studies have been made by Smith³⁵ and by Dora C. Colebrook.³⁰ The possible source of infection was found in about 80 per cent of the persons studied to be in the nose and throat of patients or contacts. The same serologic type as that causing the infection was found

30. Colebrook, Dora C.: The Source of Infection in Puerperal Fever Due to Hemolytic Streptococci, Medical Research Council, Special Report Series, no. 205, London, His Majesty's Stationery Office, 1935.

31. Colebrook, Leonard: The Prevention of Puerperal Sepsis, J. Obst. & Gynaec. Brit. Emp. 43: 691 (Aug.) 1936.

32. Kanter, A. E., and Pilot, Isadore: Hemolytic Streptococci and Their Relation to Pregnancy and the Puerperium, Surg., Gynec. & Obst. 38: 96 (Jan.) 1924.

33. King, W. W.: Throat Infections as an Etiological Factor in Puerperal Fever, with a Report of Twenty-Four Cases, Brit. M. J. 1: 533 (March 22) 1930. Williams, J. T.: The Relation of Respiratory Infections to Puerperal Infection, J. A. M. A. 99: 1991 (Dec. 10) 1932. Taylor, J., and Wright, H. D.: The Nature and Sources of Infection in Puerperal Fever, J. Obst. & Gynaec. Brit. Emp. 37: 213, 1930. Smith, John: A Further Investigation into the Source of Infection in Puerperal Fever, J. Obst. & Gynaec. Brit. Emp. 40: 991 (Oct.) 1933. Report No. 1, Scottish Scientific Advisory Committee, Department of Health for Scotland, 1931. Paine, C. G.: The Etiology of Puerperal Infection with Special Reference to Droplet Infection, Brit. M. J. 1: 243 (Feb. 9) 1935.

34. Rolfs, F. O.; Trussell, R. E., and Plass, E. D.: Serological Study of Hemolytic Streptococci from the Throat, Nose and Vagina of Antepartum Obstetric Patients, Am. J. Obst. & Gynec. 35: 1009 (June) 1938. Lancefield, R. C., and Hare, R.: The Serological Differentiation of Pathogenic and Nonpathogenic Strains of Hemolytic Streptococci from Parturient Women, J. Exper. Med. 61: 335 (March) 1935.

28. Okell, C. C., and Elliot, S. D.: Cross Infection with Hemolytic Streptococci in Otorhinological Wards, Lancet 2: 836 (Oct. 10) 1936.

29. Lichtenstein, A.: Studies in Scarlet Fever: VIII. Further Investigations into Relapses, Their Nature and Prevention, Acta paediat. 12: 75, 1931; IX. A Note on the Effect of Individual Isolation on the Course and Complications of Scarlet Fever, ibid. 12: 95, 1931.

in contacts in 62 per cent of the cases. In Colebrook's series, which was intensively studied, infection was assigned in 39 cases to several sources as follows: attendants 24, infection existing at home 9 and the patient herself 6. Congdon's³⁵ results were exceptional in that by agglutinin absorption the strains causing twelve infections were found to be present in 8 instances in the patients' throat and in only 6 instances in those of attendants. Nevertheless, even he found a larger than normal percentage of carriers of hemolytic streptococci among attendants (27 per cent). Hare and Colebrook³⁶ had previously reported 30 to 40 per cent, and Bryce and Tewsley³⁷ have since obtained a value of 22 per cent. As mentioned previously, Rolfs and others found a normal incidence of 7 per cent in patients on admission.

No final conclusion can be drawn at present as to the relative importance of contact and air borne infection in maternity cases. Perhaps comprehensive studies, such as the study of Brown and Allison in a scarlet fever hospital, would provide the necessary data. Indications of the possible significance of air borne infections are furnished, however, by the findings of White³⁸ and of Cruickshank and Godber.³⁹ White observed that streptococci could be isolated from the dust of twenty-seven single bed rooms; in most instances the organisms recovered were of the same serologic type as that causing the puerperal infection of the patient concerned. She also found that, by sweeping the floor, streptococci could be recovered from the air of these rooms for several days after they had been vacated. A person who swept one of the floors came down with an acute pharyngitis and adenitis, caused by the same serologic type as that isolated from the patient who had previously occupied the room. This occurred despite the fact that the sweeper had been masked. Cruickshank and Godber investigated a small outbreak of puerperal fever in the maternity ward of a general hospital. In this instance the infection was introduced to the hospital by a patient who, infected on admission, was delivered and remained in the main maternity ward for two days before being removed to isolation. On the day she was removed and on the following day two other women who had been delivered in different labor rooms, and with different nurses, were placed in the same ward. These women became febrile one and two days later and were found to be infected with the same serologic type as the first patient. They were both sent to isolation on the day following the second new infection, but one of them had meanwhile spent a day with three other febrile women in a four bed ward. On that day the three other women were negative for the streptococcus. Two days later, however, two of them and a third woman in the main ward yielded the same type of streptococcus. The authors believe that in this instance the infection was spread via the air because (1) the noses and throats of the nursing staff yielded no group A streptococci, nor was there any common

attendant for all these patients; (2) the spread of infection by hands, instruments or utensils was not probable because of the precautions taken; (3) the infecting type of streptococcus was recovered from the air of the small ward. Cruickshank and Godber also record another suggestive incident in which one of the nurses in a maternity home who had recently recovered from a sore throat and had yielded a negative throat swab apparently was responsible for initiating the infection. One of her patients came down with puerperal fever and was removed to an isolation hospital. Within ten days two additional postparturient women were infected with the same serologic type in spite of the fact that they had been delivered in different labor rooms, housed in separate wards and were never attended by the infected nurse, who was the only one of the nursing personnel found to be carrying a group A streptococcus. Four days after the nurse was taken off duty because her throat was again positive, two additional attendants contracted tonsillitis, caused by the same serologic type. It should be added that all the nurses wore masks while on duty.

These findings indicate a possible role for air borne infection in maternity wards, in line with the clinical opinions of De Lee⁴⁰ and of Leonard Colebrook⁴¹ as well as of Robinson and Cuttle⁴² on puerperal scarlet fever. The evidence, nevertheless, is not so strong as that which might be obtained by more extensive bacteriologic investigation.

Children's Hospitals: Nosocomial respiratory infections in infants' and children's hospitals constitute another serious problem. Although no extended and detailed study of air as a vehicle of contagion in these hospitals has been made, the types of infections that do occur suggest a mechanism or mechanisms similar to those found in other wards. Long and his associates⁴³ in the Infants' Hospital, Boston, found in one year an incidence of 12.6 per cent (185 of 1,445) of new infections, of which 7.1 per cent (110) were respiratory, and in a second year an incidence of infection of 10.3 per cent (60 of 585), of which 6.5 per cent (38) were respiratory. It is of interest that these relatively high rates occurred despite the fact that all the children were nursed in cubicles (without doors). In some instances the possible primary source of infection could be traced to a nurse or other patient, but in others it could not be traced. The Boston workers were of the opinion that masking of the personnel was efficacious in reducing the incidence of infection. However, Wright⁴⁴ of the University College Hospital, London, came to the conclusion that the upper respiratory tract of nurses did not seem to play an important part in the spread of infection among children in that institution. She found a higher intercurrent infection rate, 18.9 per cent (104 of 551), than did the Boston workers and also determined that streptococci were acquired by 13.1 per cent (72) of the children during hospitalization. Wright studied four different outbreaks of streptococcal infections, each of which was caused by a specific serologic type. Although in some instances the infection seemed to spread from bed to bed, she concluded that the exact mode of spread was not ascertainable. Lately Coburn

35. Congdon, P. M.: Streptococcal Infection in Childbirth and Septic Abortion: Source of Infection and Grouping of Hemolytic Strains, *Lancet* 2:1287 (Dec. 7) 1935.

36. Hare, Ronald, and Colebrook, Leonard: Biochemical Reactions of Hemolytic Streptococci from Vagina of Febrile and Afebrile Parturient Women, *J. Path. & Bact.* 39:429 (Sept.) 1934.

37. Bryce, L. M., and Tewsley, P.: A Bacteriological and Clinical Study of the Professional Personnel of Maternity Hospitals with Special Reference to Carriers of Hemolytic Streptococci, *M. J. Australia* 1:639 (April 9) 1938. Bryce, L. M.: Note on Type of Haemolytic Streptococci Occurring in Outbreak of Puerperal Sepsis, *ibid.* 1:900 (June 17) 1939.

38. White, Elizabeth: On the Possible Transmission of Haemolytic Streptococci by Dust, *Lancet* 1:941 (April 25) 1936.

39. Cruickshank, R., and Godber, G. E.: The Aerial Spread of Streptococcal Infections, *Lancet* 1:741 (April 1) 1939.

40. De Lee, J. B., and Siedentopf, Heinz: The Maternity Ward of the General Hospital, *J. A. M. A.* 100:6 (Jan. 7) 1933.

41. Robinson, A. L., and Cuttle, G. E.: Infectious Puerperal Fever, *Lancet* 1:67 (Jan. 11) 1939.

42. Long, A. P.; McKhann, C. F., and Cheney, L. L.: Hospital Infections: II. Nasopharyngeal Flora and Disease of the Respiratory Tract in Infants, *Am. J. Dis. Child.* 57:1363 (June) 1939; III. A Ward Study for Sources of Infection, *ibid.* 60:322 (Aug.) 1942.

43. Wright, Joyce: Nosocomial Infections in Children's Wards, *J. Hyg.* 40:647 (Dec.) 1940.

and Pauli⁴⁴ have reported a fairly extensive streptococcus epidemic in Babies Hospital in New York which they believe to have been dust borne.

Other Hospitals: The possibility of air borne spread of streptococcal infections in other hospital departments is suggested by a number of studies. Thus, in a ward where burns were treated Cruickshank⁴⁵ found that the incidence of streptococcal infections in burns increased from 11 per cent (11 of 100) on admission to 51 per cent after periods of time ranging up to two months⁴⁶ Cruickshank was also able to recover many streptococci from the air of this ward. Likewise, streptococcal infections occurring in operating rooms have been traced to the nasopharynx of nurses by Meleney and Stevens,⁴⁷ and by Miles and his associates.⁴⁸ Similarly in studies in otorhinologic wards Okell and Elliot,²⁸ supported by Garrod,⁴⁹ have traced cross infections which suggested an air borne basis to them, and Keevil and Camps⁵⁰ were able to recover streptococci of the same type as those found among the patients from the air of a general hospital ward and a maternity ward.

A problem of the hour is the infection of war wounds during hospitalization. In the first world war Fleming and Porteus⁵¹ found that, while the wounds of 20 per cent of patients were infected with streptococci on reaching a base hospital, those of 90 per cent were thus infected after one week's stay. Stokes and Tyler⁵² reported similar findings. Hare⁵³ has suggested that the relatively high rate of infection on admission is explainable by the gantlet of hands and throats through which the patient must travel before entering the base hospital—hands and throat with streptococcus carrier rates of 0 to 4 per cent and about 7 per cent respectively (Colebrook, Maxted and Johns;⁵⁴ Hare⁵⁵). The findings in the current war are similar. Miles and his associates⁴⁸ report that the organisms most frequently found in wounds on admission to the hospital are hemolytic staphylococci and streptococci and that the wounds of 58 per cent (43) of a group of 74 patients acquired a new species of bacteria in an average time of about ten days after admission. As has been shown in other wards during peace time, the spread of streptococci to wounds can be traced by serologic typing. It is interesting to note that twenty of twenty-nine wounds treated with plaster casts yielded streptococci and that clinical signs of infection were manifested by about 80 per cent of those infected. These authors and Hare and Willits,⁵⁵ who were able to recover from the ward air the infecting streptococci of 9 of 11 patients, suggest that

hospital dust is an important source of infection and their position is supported editorially by the *Lancet*⁵⁶ as follows: "There is still a certain reluctance to accept air borne bacteria as a factor in hospital cross infection, partly because of the apparent paucity of pathogens in the air of the ward, partly because bacteria in air or dust are regarded as less likely to be in an active vegetative state than those coming directly from the body tissues, yet it seems likely that a very few streptococci will be sufficient to initiate infection on an abraded surface, and there is increasing evidence that the air and dust of the ward are the vehicles for the spread of infection." Incidentally the possibility of the indirect spread of infection by stirred up dust rather than by droplets, or the so-called droplet nuclei of Wells, is supported by an observation of Hare's.⁵⁷ He recovered streptococci from the rooms of two of five students who had suffered from upper respiratory infections. In one instance a student had been confined to his room for three or four days with streptococcal sore throat and a paronychia. The specific serologic type was recovered from the bed sheets, pillow, pajamas and carpet. Three weeks later, with the student still carrying the organisms, it was again recovered from his bed sheet and pajamas. Incidentally Hare⁵⁸ came to a similar conclusion on the relative importance of dust as the result of a laboratory investigation. He could find little evidence for the expulsion of droplet nuclei by normal carriers of hemolytic streptococci during talking or even coughing. It is only fair to add, however, that the possible expulsion of droplet nuclei during sneezing by healthy or sick carriers was not investigated.

PNEUMOCOCCIC INFECTIONS

Pneumonia is now recognized to be a contagious disease. This is because (1) epidemics due to specific types of pneumonia sometimes occur in children's institutions, men's dormitories, hospitals for the insane and isolated villages,⁵⁹ (2) 2 or more cases caused by the same strain sometimes occur within a small time interval in the same family or in a hospital ward⁶⁰ and (3) immediate contacts in families and in hospitals sometimes yield a greater proportion of throat carriers of

56 Cross Infection of Wounds, editorial, *Lancet* 1:79 (Jan. 18) 1941.

57 Hare, Ronald Hemolytic Streptococci in Normal People and Carriers, *Lancet* 1:85 (Jan. 18) 1941.

58 Hare, Ronald The Expulsion of Hemolytic Streptococci by Nasopharyngeal Carriers, *Canad. Pub. Health J.* 31:539 (Nov.) 1940.

59 Schroeder, M. C., and Cooper, G. An Epidemic of Colds, Bronchitis and Pneumonia Due to Type V Pneumococci, *J. Infect. Dis.* 46:384 (May) 1930. Ström, A. An Epidemic of Croupous Pneumonia Caused by Pneumococcus Type I, *ibid.* 50:430 (May/June) 1932.

Wallbruch, E. Die lobäre Pneumonie als epidemisch auftretende Erkrankung, *Ztschr. f. Hyg. u. Infektionskr.* 117:92, 1935. Smillie, W. G.: A Study of an Outbreak of Type II Pneumococcal Pneumonia in the Veterans' Administration Hospital at Bedford, Mass., *Am. J. Hyg.* 24:522 (Nov.) 1936. Harris, A. H., Jr., and Ingraham, H. S.: A Study of the Carrier Condition Associated with Type II Pneumonia in a Camp of the Civilian Conservation Corps, *J. Clin. Investigation* 16:41 (Jan.) 1937.

Gilman, B. B., and Anderson, G. W.: A Community Outbreak of Type I Pneumococcal Infection, *Am. J. Hyg.* 28:345 (Nov.) 1938. Smillie, W. G.; Warnock, G. H. and White, H. J.: A Study of the Type I Epidemic at the State Hospital at Worcester, Mass., *Am. J. Pub. Health* 28:293 (March) 1938. Benjamin, J. E.; Ruegger, J. M., and Senior, F. A.: Cross Infection in Pneumococcal Pneumonia, *J. A. M. A.* 112:1127 (March 25) 1939. Stebbins, E. L., Perkins, J. E., Rogers, E. S., Champlin, R. D., and Ames, W. R. Prevalence of Pneumococcus Carriers, Specific Types in Epidemic and Non-epidemic Areas, *Am. J. Pub. Health* 30:349 (April) 1940. Dauer, C. C.; Dowling, H. F., and Noble, J. E. An Outbreak of Type II Pneumococcus Pneumonia in an Institution for Children, *Am. J. Hyg., Sect. A* 33:1 (Jan.) 1941.

60 Tilghman, R. C., and Finland, Maxwell: Pneumococcal Infections in Families, *J. Clin. Investigation* 15:493 (Sept.) 1936. Finland, Maxwell, and Tilghman, R. C.: Bacteriological and Immunological Studies in Families with Pneumococcal Infections. The Development of Type Specific Antibodies in Healthy Contact Carriers, *ibid.* 15:501 (Sept.) 1936. Benjamin, Ruegger and Senior,⁵⁹ Holle, H. A., and Bullowa, J. G. M. Pneumococcal Cross Infections in the Home and Hospital, *New England J. Med.* 223:887 (Nov. 28) 1940. Rogers, E. S.; Robins, M., and Arnstein, M. G.: Secondary Attack Rates in Pneumonia, *Am. J. Pub. Health* 31:135 (Feb.) 1941.

44 Coburn, A. F., and Pauli, R. H. The Interaction of Host and Bacterium in the Development of Communicability by Streptococcus Hemolyticus, *J. Exper. Med.* 73:551 (April) 1941.

45 Cruickshank, Robert The Bacterial Infection of Burns, *J. Path. & Bact.* 41:367 (Sept.) 1935.

46 It has been suggested that the toxic effect of burns is caused by bacterial infection (Aldrich, R. H. The Role of Infection in Burns, *New England J. Med.* 208:289 [Feb. 9] 1933).

47 Meleney, F. L., and Stevens, F. A. Postoperative Hemolytic Streptococcus Wound Infections and Their Relation to Hemolytic Streptococcus Carriers Among the Operating Personnel, *Surg., Gynec. & Obst.* 43:338 (Sept.) 1926.

48 Miles, A. A. Schwaabacher, H., Cunliffe, A. C., Ross, J. P.; Spooner, E. T. C.; Pitcher, R. S., and Wright, J. Hospital Infection of War Wounds, *Brit. M. J.* 2:855 (Dec. 28) 1940.

49 Garrod, T. P. Cross Infections in Otorhinological Wards, *Lancet* 2:944 (Oct. 17) 1936.

50 Keevil, N. L., and Camps, F. E. Epidemic Streptococcal Infections in a General Hospital, *Lancet* 2:207 (July 24) 1937.

51 Fleming, A., and Porteus, A. B. Streptococcal Infections of Septic Wounds at a Base Hospital, *Lancet* 2:49 (July 12) 1919.

52 Stokes, A., and Tyler, W. H. Bacteriology of Wounds, *Brit. J. Surg.* 6:92 (July) 1918.

53 Hare, Ronald Sources of Hemolytic Streptococcal Infection of Wounds in War and in Civil Life, *Lancet* 1:109 (Jan. 20) 1940.

54 Colebrook, Leonard; Maxted, W. R., and Johns, A. M. Presence of Haemolytic and Other Streptococci on Human Skin, *J. Path. & Bact.* 41:521 (Nov.) 1935.

55 Hare, Ronald, and Willits, R. E. The Source and Prevention of Septic Infection of Wounds, *Canad. M. A. J.* 44:230 (March) 1941.

the specific type than is found in the population at large.⁶¹

Although the biology of the pneumococcus is in some respects similar to that of the streptococcus, little direct evidence has been adduced for the air borne transmission of pneumococcal infection. This may or may not be due to the fact that the possibility of air borne infection has not been extensively investigated. The only clinical evidence for the air borne route of infection is that pneumococci apparently can be recovered from the environment of patients without great difficulty. In the early years of bacteriology there were several reports that pneumococci could be recovered from house and hospital dust (Netter, Maximovitch; Emmerich, Washbourn and Eyre, all cited by Washbourn⁶²), and in 1917 Stillman⁶³ was able to recover pneumococci frequently enough from house dust to write that "the occurrence of these disease producing types of pneumococci in the dust suggests the possibility that air borne infection may play a part in the production of pneumonia." Stillman had been able to isolate pneumococci of the homologous type from the floor dust of the homes of 50 per cent (26 of 52) of patients with pneumonia caused by types I or II who were admitted to the hospital of the Rockefeller Institute. It is of interest that contacts in only 28 per cent (15 of 52) of these homes yielded throat cultures of the homologous type of pneumococcus.

DIPHTHERITIC INFECTIONS

It has been pointed out both by Kemkes and Steigler⁶⁴ and by Glass and Wright⁶⁵ that some hospitalized diphtheria patients suffer reinfections by diphtheria bacilli. Wright, Shone and Tucker,⁶⁶ who investigated the incidence of such infections and their mode of spread, concluded that "contact between patients is responsible in large part for cross infection but that other important sources are carriers among the ward staff and the dust on the floor of the ward." The data presented are of the same type as those obtained in scarlet fever wards. It seems however that, although the existence of air borne infection is definitely appreciated by these authors, its extent may not be. Thus they express discouragement because the incidence of reinfection was not very much lower in two wards nursed by bed isolation (5 per cent) than in two others not so nursed (10 per cent). Furthermore, their data indicate that the number of reinfections found is probably much less than the number which actually occurred. Thus they noted that only 4 of 33 patients who were originally infected with the gravis type became reinfected, whereas 5 of 16 originally infected with either the intermedius or the mitis type were so afflicted. This difference in the percentage incidence of reinfection can probably be ascribed to the fact that in order that a new infection be recognized it must be induced by one of the two types not causing the original infection. Two thirds of the patients, however, were infected by the gravis type and so reinfections which might be caused by this type would have been largely undetectable.

61 There have been many confirmations of this finding first reported by Dochez and Avery. (*The Occurrence of Carriers of Disease Producing Types of Pneumococcus*, J. Exper. Med. 22: 105, 1915.)

62 Washbourn, J. W. *The Natural History and Pathology of Pneumonia*, Lancet 2: 1439, 1902.

63 Stillman, E. G. *Further Studies on the Epidemiology of Lobar Pneumonia*, J. Exper. Med. 26: 513 (Oct.) 1917.

64 Kemkes, B., and Steigler, A. *Zur Typenverteilung der Diphtheriebacillen und zur Frage der Superinfektion in Keankensanstalten*, Klin. Wochenschr. 16: 1649 (Nov. 20) 1937.

65 Glass, V., and Wright, H. D. *Cross Infection in Diphtheria*, J. Hyg. 38: 248 (March) 1934.

66 Wright, H. D., Shone, H. R., and Tucker, J. R. *Cross Infection in Diphtheria Ward*, J. Path. & Bact. 52: 111 (Jan.) 1941.

These patients, accordingly, would be susceptible to apparent reinfection only by strains from the remaining third of the patients. The latter, on the other hand, were susceptible to demonstrable reinfection for more than two thirds of the other patients. The authors believe that nurse contacts may be important in the spread of infection, but only 12 nurses of 122, from whom 714 pairs of swabs were taken, were found to be positive for the diphtheria bacillus and in one ward 33 nurses from whom 193 pairs of swabs were taken, were all negative. Furthermore, it was found that a number of patients nursed in cubicles for fairly extended periods showed no signs of reinfection, which is not what would be expected if nurses play an important role in the dissemination of infection. Finally they were able to recover diphtheria bacilli from the floor sweepings of four wards in one hospital in sixteen of seventeen trials, from two of three wards in a second hospital and from three of four wards in a third hospital. As might be expected from the previous information, gravis was the predominant type recovered. In some instances the number of colonies recovered was small, but more often it was large, and in many instances several hundred were present on each plate. Three samples of dust which were kept in test tubes and reexamined after a month yielded about the same numbers of still virulent organisms. In one specimen a gravis strain remained alive and virulent for two months. These facts appear to have had sufficient appreciation by the authors to justify their making the following statement: "We have been surprised at the ease and frequency with which *Corynebacterium diphtheriae* can be demonstrated in ward sweepings and at times astounded at the enormous numbers of fully virulent gravis organisms which appear on plates."

THE 'THERAPEUTIC TEST' OF THE AIR BORNE HYPOTHESIS

What might be called a therapeutic test of the air borne hypothesis has been carried on during the past several years. If the air borne route is important, measures which rid the environment of micro-organisms which might spread by this means should reduce the incidence of respiratory infections. This has actually been found in several instances in work which is still in its earliest phases.

Before the methods used and the results obtained are discussed, however, it may be of value to construct an ideal picture of the distribution of micro-organisms in a sickroom. If we could actually see the streptococci in a scarlet fever ward the following is what we might observe: Entering about 9 o'clock in the morning we examine 1 of the patients. Many streptococci are seen in his nose and throat. Smaller numbers are also observed on his hands, a few are noted on his face in the region of the nose and mouth, and an occasional one appears on more distant surfaces. Likewise the nasopharynx of an attendant is seen to harbor the same type of organism but not in such large numbers, some streptococci are noted on her hands and several on her clothes as well. Examination of the bed reveals a fair number of organisms resting on the top sheet. When this is lifted off others are seen on the undersheets, the pillows and the bedclothes of the patient. A glance at the air of the room next reveals a fairly uniform distribution of streptococci, except for a temporary concentration within a radius of a few yards of a patient who has just sneezed and around a bed the linen of which is being changed. It is also noted that strepto-

cocci are settling out on the floor in a regular manner. Further study of the floor reveals many organisms which tend to gather near the beds and diminish in number around the windows, particularly at the southern end of the room. At this point an attendant walks briskly through the room with his long coat fluttering in the breeze, and it is noted that many streptococci are stirred up from the floor and become resuspended in the air. Finally, if we were to return to the ward in the middle of the night we might observe few organisms in the air but many on the floor.

It is clear then that any ideal system which may be developed for the prevention of air borne transmission of streptococcal infection in a scarlet fever ward must destroy the organisms situated in the following places:

A. The host:

1. The patient's nasopharynx, hands and bedclothes.
2. His attendant's nasopharynx and perhaps his hands and clothes as well.

B. The environment:

1. The air of the room.
2. The floor of the room.

It is obvious that no single method so far advocated can be expected to eliminate streptococci from all these areas. For practical purposes, however, two distinct lines of approach are possible, each of which attempts to break the infection cycle at a different point:

The first would attempt to destroy micro-organisms at their immediate source, i. e. in the host, or to prevent the throats of others from becoming infected. This is technically the most difficult procedure and but little effort has been expended on it until very recently. Delafield, Straker and Topley⁶⁷ (1941) have reported that the use of snuffs made of sulfathiazole, penicillin or proflavine, with a base of lycopodium spores or magnesium carbonate, temporarily reduced the number of organisms recoverable from the nose of staphylococcus carriers. Similarly Young and Charteris⁶⁸ suggest that sprays of proflavine and acriflavine cut down the incidence of postoperative scarlet fever in a nose and throat department.

The second approach, for which the air borne hypothesis serves as a rationale, is to attempt to rid the environment of its micro-organisms. At present two main lines are being followed toward this end, although several subsidiary ones have been suggested. One of these attempts to destroy the micro-organisms by ultraviolet light and the other by chemical sprays, the so-called aerosols.

ULTRAVIOLET LIGHT

Up to the present ultraviolet light has been the most widely used of the two, largely because of the pioneering efforts of Wells.⁶⁹ Lamps emitting these rays are now installed in infants' and children's hospitals, in nursing homes for children, in operating rooms and in schools. Such lamps are highly bactericidal; it is

asserted by Wells that micro-organisms can be removed from air by this means at a rate far greater than that attainable by any type of mechanical ventilation. Furthermore the method has the advantage that it is almost automatic in operation. There are two minor limitations to the use of ultraviolet light which are, however, far from insurmountable. The first is the deleterious effect of ultraviolet light on the eyes and skin. This can be overcome by shielding the body, which is not always feasible, or by shielding the lamp, which may reduce its efficiency. The second objection depends on the inverse square law; lamps suspended from a ceiling are least effective against bacteria which are on the floor.

The use of ultraviolet light has yielded encouraging results despite the fact that the field is only currently being developed.⁷⁰ Three reports have appeared concerning the disease chickenpox, which is presumably of virus causation and about whose mode of transmission little is known. McKhann and his associates⁷¹ reported that chickenpox failed to spread from 12 cases treated in an isolation ward over a period of five months to all but 1 of 120 other children on the same floor who were separated from the infected room by an ultraviolet light barrier. Greene and his associates⁷² reported a still more striking result. They were engaged in a study of the effectiveness of ultraviolet light in a home for infants and children when an epidemic of chickenpox occurred. At that time they had under study two infants' wards, one with and the other without ultraviolet light. Ninety-seven per cent (165 of 170) of the children who were housed in the main building and 18 of 19 in the unirradiated control ward contracted chickenpox, whereas in the irradiated ward not a single case developed. It is interesting that a night nurse in the latter ward also cared for children in an adjoining ward, where the incidence of infection was 100 per cent. Finally, Wells⁷³ has reported that for three successive years young children in the irradiated rooms of a school were spared not only from chickenpox but from mumps as well, when these diseases were prevalent in other parts of the school.

There have also been two reports on the effectiveness of ultraviolet light in reducing the general incidence of respiratory infections as a whole in children's institutions. Encouraging results have been published by del Mundo and McKhann,⁷⁴ who used ultraviolet barriers across the entrance of the individual cubicles in an infants' hospital, and by Greene and his associates in the study mentioned.

The first practical results of the use of ultraviolet light in operating rooms were reported by Hart.⁷⁵

70. Wells, W. F.; Stokes, J., Jr.; Wells, Mildred W., and Wilder, T. S.: Experiments in the Environmental Control of Epidemic Respiratory Infection, *Tr. & Stud., Coll. Physicians, Philadelphia* 7: 342, 1940.

Robertson, E. C.; Doyle, M. E.; Tisdale, F. F.; Koller, L. R., and Ward, F. S.: Air Contamination and Air Sterilization, *Am. J. Dis. Child.* 58: 1023 (Nov.) 1939.

71. McKhann, C. F.; Steger, A., and Long, A. P.: Hospital Infections: I. A Survey of the Problem, *Am. J. Dis. Child.* 55: 579 (March) 1938.

72. Greene, David; Barenberg, L. H., and Greenberg, Bernard: Effect of Irradiation of the Air in a Ward on the Incidence of Infections of the Respiratory Tract with a Note on Varicella, *Am. J. Dis. Child.* 61: 273 (Feb.) 1941.

73. Wells, W. F.: Studies on Air Borne Infection, *Science* 92: 457 (Nov. 15) 1940.

74. del Mundo, F., and McKhann, C. F.: Effect of Ultraviolet Radiation of Air on Incidence of Infections in an Infants' Hospital, *Am. J. Dis. Child.* 61: 213 (Feb.) 1941.

75. Hart, Deryl: Sterilization of the Air in Operating Room by Special Bactericidal Radiant Energy: Results of Its Use in Extrathoracic Thoracoplasties, *J. Thoracic Surg.* 6: 45 (Oct.) 1936. Hart, Deryl, and Gardner, C. E., Jr.: Sterilization of the Air in the Operative Region with Bactericidal Radiant Energy, *Tr. South. S. A.* 49: 377, 1937.

Hart, Deryl, and Schiebel, H. M.: Role of Respiratory Tract in Contamination of Air, *Arch. Surg.* 28: 788 (April) 1939. Hart, Deryl: Sterilization of Air in Operating Room with Bactericidal Radiation: Results from Nov. 1, 1938 to Nov. 1, 1939, with Further Report as to Safety of Patients and Personnel, *ibid.* 41: 334 (Aug.) 1940.

67. Delafield, M. E.; Straker, E., and Topley, W. W. C.: Antiseptic Snuffs, *Brit. M. J.* 1: 145 (Feb. 1) 1941.

68. Young, G., and Charteris, A. A.: Use of Proflavine and Acriflavine in a Throat and Nose Department, *Brit. M. J.* 2: 489 (Oct. 12) 1940.

69. Wells, W. F., and Fair, G. M.: Viability of *B. Coli* Exposed to Ultraviolet Radiation in Air, *Science* 82: 280 (Sept. 20) 1935. Wells, W. F., and Wells, Mildred W.: Air Borne Infection, *J. A. M. A.* 107: 1698 (Nov. 21), 1895 (Nov. 28) 1936. Sharp, D. G.: A Quantitative Method of Determining the Lethal Effect of Ultraviolet Light on Bacteria Suspended in Air, *J. Bact.* 35: 589 (June) 1938. Koller, L. R.: Bactericidal Effects of Ultraviolet Radiation Produced by Low Pressure Mercury Vapor Lamps, *J. Appl. Physiol.* 10: 624, 1939. Wells, W. F., and Wells, Mildred W.: Measurement of Sanitary Ventilation, *Am. J. Pub. Health* 28: 343 (March) 1938. Wells, W. F.; Wells, Mildred W., and Mudd, Stuart: Infection of Air: Bacteriologic and Epidemiologic Factors, *ibid.* 29: 863 (Aug.) 1939. Wells, W. F.: Bactericidal Irradiation of Air: Part I. Physical Factors, *J. Franklin Inst.* 220: 347, 1940.

who, with his associates, has found that infections with *Staphylococcus aureus* after thoracoplasty were definitely reduced by this means. There is now little or no question that ultraviolet light reduces the number of organisms in the air of operating rooms (Robertson and Doyle⁷⁶) as well as the incidence of wound infections after several different types of operation (Meleney⁷⁷). However, it has been pointed out that wounds may also be contaminated directly by skin carriers of *Staphylococcus aureus*. Thus Gillespie, Devenish and Cowan⁷⁸ noted a significant skin (wrist) carrier rate of that organism, and Devenish and Miles⁷⁹ found that the high incidence of infection in one operating room could be traced to a surgeon who was such a carrier. They believed that infected sweat, leaking through gloves, which were often punctured, was responsible for most of the infections.

It is noteworthy that a subcommittee of the Council on Hospital Planning and Plant Operation of the American Hospital Association has recommended that the installation of ultraviolet light equipment should be considered when new contagious disease or surgical operating units are built.⁸⁰

CHEMICAL SPRAYS

It is many years since the practice of spraying phenol (carbolic acid) into the air of operating rooms, introduced by Lister, was abandoned. Aseptic technic had come to be considered sufficient to prevent infection during operations. With the rebirth of the air borne hypothesis the general method of spraying germicidal agents into the air has been revived, although now a much wider application is intended (Trillat and Fouassier⁸¹).

Chemical sprays possess a theoretical advantage over ultraviolet light in that they may have greater penetrating power and be more effective at a distance. Sprays, however, may be noxious or unpleasant to man or injurious to room furnishings, and, unlike ultraviolet light, their application must be constantly supervised. At present the ability of three groups of substances to kill bacteria suspended in air is being studied: (1) sodium hypochlorite, (2) substances of known disinfecting power such as resorcinol and hexylresorcinol dissolved in a vehicle such as propylene glycol and (3) some of the higher alcohols alone, such as propylene glycol, ethylene glycol and trimethylene glycol. Most of the substances of all three groups which have been tested by spraying have been found to be potent germicides for bacteria suspended in air.

The first germicidal spray advocated in the present era was sodium hypochlorite. Douglas, Hill and Smith⁸² in 1928 reported that this substance would produce a great reduction in the number of organisms in the air

of a room previously sprayed with *Escherichia coli*. In 1938 Masterman⁸³ confirmed the efficacy of hypochlorite when sprayed in dilute solution in a normal room environment and promoted an apparatus for its practical application. In the same year Trillat⁸⁴ also pointed out the possible usefulness of sodium hypochlorite. Some difference of opinion exists, however, as to the mode of action of sodium hypochlorite and its relative worth as a practical aerosol. Baker, Finn and Twort⁸⁵ believe that hypochlorous acid is more lethal when in solution and sprayed as a mist than when used in gaseous form and also suggest that its use is limited by its odor, irritating effects and opacity. Masterman⁸⁶ disagrees. He is of the opinion that gaseous hypochlorous acid is the most effective phase of the germicide and that its objectionable qualities are more theoretical than actual. Likewise Pulvertaft and Walker⁸⁷ believe that the cheapness and deodorizing qualities of the hypochlorite compensates to some extent for its lesser effectiveness as compared with some other substances.

In 1938 Trillat⁸⁴ advocated the use of a supersaturated aqueous solution of resorcinol with glycerin and suggested that the germicidal efficiency of chemical substances was dependent on the interaction of very small particles of the incompletely evaporated mist with the suspended bacteria. Pulvertaft, Lemon and Walker⁸⁸ confirmed his finding and also noted the effectiveness of a solution of 5 per cent chloramine-T in acetone, alcohol, glycerin and water to which a small amount of sulfonated oleic acid had been added as a wetting agent. They observed that this mixture was efficiently bactericidal only when the infectious material was allowed to dry. They also reported that bacteria on a porous test surface, in contrast to those on a smooth surface, were not very efficiently attacked by any of the germicides tested except solution of formaldehyde. Pulvertaft and Walker⁸⁷ later devised a solution in which resorcinol replaced chloramine-T, and ethylene glycol replaced glycerin.

The most comprehensive single study on chemical sprays up to the present is that of Twort, Baker, Finn and Powell.⁸⁹ These workers found that, although many substances exerted a germicidal effect in the air, the extent of which could not be predicted from their *in vitro* activity, the most effective all around solution was one in which 10 per cent hexylresorcinol was dissolved in propylene glycol to which was added 0.05 per cent sulfonated lauryl. They came to the conclusion that the most effective germicidal particles were those of a radius of 0.5 to 1.0 micron. They also found that germicidal mists were capable of penetrating cloth barriers and acting on bacteria within and that, though the mists were relatively effective in killing bacteria on horizontal smooth surfaces, they were less effective on vertical ones.

76 Robertson, E. C., and Doyle, M. E. On Control of Air Borne Bacteria in Operating Rooms and Hospital Ward, *Ann. Surg.* **111**: 491 (March) 1940.

77 Meleney, F. L.: The Prevention and Treatment of Infection in Wounds, Both Operative and Accidental, *Bull. New York Acad. Med.* **17**: 221 (March) 1941.

78 Gillespie, E. H.; Devenish, E. A., and Cowan, S. T. Pathogenic *Staphylococci*: Their Incidence in the Nose and on the Skin, *Lancet* **2**: 870 (Oct. 21) 1939.

79 Devenish, E. A., and Miles, A. A. Control of *Staphylococcus aureus* in an Operating Theater, *Lancet* **1**: 1088 (May 13) 1939.

80 Ultraviolet Rays as a Sterilization Agent in Hospitals, Council on Hospital Planning and Plant Operation, *Am. Hosp. A. Bull.*, 1940, no. 203.

81 Trillat, A., and Fouassier, M.: Action des doses infinitesimales de diverses substances alcalines fixes ou volatiles sur la vitalite des microbes, *Compt. rend. Acad. d. sc.* **155**: 1184, 1912, Influence de la radio-activite de l'air sur les goutelettes microbiennes de l'atmosphere, *ibid.* **159**: 817, 1914.

82 Douglas, S. R.; Hill, L., and Smith, W. Effect of Antiseptic Sprays on the Bacterial Content of Air, *J. Indust. Hyg.* **10**: 215, 1928.

83 Masterman, A. T. Air Purification in Inhabited Rooms by Spraying or Atomizing Hypochlorites, *J. Indust. Hyg. & Toxicol.* **10**: 278 (April) 1938.

84 Trillat, A. Propriete des aerosols microbiens applications, *Ann. d'hyg.* **16**: 49 (Feb.) 1938, Sur la desinfection dite "permanente", *Hyg. sociale* **7**: 178, 1938, Les aerosols microbiens applic. nos. B II Acad. de med. Paris **110**: 64 (Jan. 11) 1938.

85 Baker, A. H., Finn, S. R., and Twort, C. C. The Use of Hypochlorites for Aerial Disinfection, *J. Hyg.* **10**: 569 (Sept.) 1940.

86 Masterman, A. T. Air Purification by Hypochlorous Acid Gas, *J. Hyg.* **41**: 44 (Jan.) 1941.

87 Pulvertaft, R. J. V., and Walker, J. W. The Control of Air Borne Bacteria and Fungus Spores by Means of Aerosols, *J. Hyg.* **50**: 696 (Nov.) 1939.

88 Pulvertaft, R. J. V., Lemon, G. C., and Walker, J. W. Aqueous Aerosols for Surface Sterilization, *Aerosols, Lancet* **1**: 443 (Feb. 2) 1939.

89 Twort, C. C., Baker, A. H., Finn, S. R., and Powell, F. O. The Disinfection of Closed Atmospheres with Germicidal Aerosols, *J. Hyg.* **40**: 253 (May) 1941.

Twort and his associates believe that the solvent plays a more significant role in the action of aerial germicides than has been considered and state that they were investigating the potency of glycol solutions when used alone. Meanwhile a report by Robertson and his co-workers⁹⁰ indicates that propylene glycol, ethylene glycol and trimethylene glycol are all effective aerial germicides. Twort and Baker⁹¹ have reported on the germicidal activity of several organic smokes, such as those from cardboard, incense and balsam candles. In a review of the findings of his group Twort⁹² has listed the following materials according to a decreasing order of effectiveness; the hexylresorcinol solution described, a supersaturated aqueous solution of resorcinol in glycerin, organic smokes and, lastly, sodium hypochlorite solution. Because of the present emergency in England a group of workers at the National Institute for Medical Research is now investigating the problem.

The possible injurious effects of aerosols generally on experimental animals over long periods has not as yet been adequately studied. Such studies would appear desirable before large scale applications are attempted. Few applications have been reported as yet.

Of two brief notes one, which is nonclinical, records a significant reduction in the number of flasks contaminated in a vaccine bottling laboratory after the air had been sprayed with resorcinol solution (Wats and Kamat⁹³). In the other, by Cruickshank and Muir,⁹⁴ it is suggested that a resorcinol solution sprayed on two consecutive days into the air of a small ward in which streptococci were widespread immediately reduced the incidence of nose carriers of streptococci from four persons to one. Finally it is noteworthy that sprays are now being used in some air raid shelters in London.⁹⁵

OTHER CONTROL MEASURES

The complete isolation of each bed seems to be the ideal means for combating the aerial spread of infection in hospitals. In default of this procedure the two measures just discussed and others which may be called "common sense" means are indicated. The latter are mechanical ventilation and filtration, which have been shown to limit the bacterial contamination of air in infant incubators (Chapple and Kenny⁹⁶) and the limitation of dust. Most bacteria cast into air must eventually settle on some surface. When that surface happens to be a floor or a bed, some of the bacteria will inevitably be resuspended in the air. A practical method of preventing the raising of bacteria from floors and bedclothes may go a long way toward solving the problem of air borne infection. Certainly the dry sweeping of floors should be discouraged. Likewise improved methods to prevent dust from rising from floors would be valuable. It is of interest that the problem has been

approached from this point of view. Van den Ende, Lush and Edward⁹⁷ found that, after a floor had been treated with crude liquid paraffin (spindle oil) and then inoculated with streptococci, few organisms could be raised from the floor by sweeping for one minute. One coating, which was slippery for twenty-four hours, lasted for at least ten days even if treated with soap or saponated solution of cresol. However, these workers were unable effectively to combine an antiseptic with the oil. It is also suggested⁹⁸ that bed coverings can be made to retain bacterial dust by treatment with 30 per cent liquid paraffin in white spirit (a petroleum product used in dry cleaning).

SUMMARY

The hypothesis that respiratory infections are largely air borne is considered more satisfactory than the theory that they are spread by direct contact because of the findings along three distinct lines of research.

The first consists of evidence adduced by surveys and laboratory studies. It has been shown that an organism such as the alpha hemolytic streptococcus, which is a common nonpathogenic inhabitant of the upper respiratory tract of man, can be recovered readily from man's environment. This organism can survive for days in indoor environments, and the numbers found in any location seem to serve as an index of the conditions of occupancy and ventilation. Strains of the human pathogenic group A beta hemolytic streptococcus can also be recovered from a "normal" environment with practically unimpaired virulence, although in relatively small numbers. In the laboratory it has been shown that streptococci artificially sneezed into air float for relatively long periods. They settle out geometrically and, having settled, they die geometrically at rates which vary with the length of the bacterial chain and prevailing conditions of the environment. Organisms which have settled out of air may be readily resuspended therein. In the presence of sunlight and even diffuse daylight which have passed through the glass of a window, both streptococci and pneumococci on a simulated floor die at a much faster rate than they do in the dark. If the air borne route is an important vehicle for the spread of respiratory infection, then ordinary diffuse daylight in rooms may act as a strong deterrent to the spread of such infections.

Little is known of the manner of spread of virus infections of the respiratory tract, but it has been shown in the laboratory that ferrets can be infected by spraying the air with influenza virus and that this virus can be recovered from the air after thirty minutes. Likewise when the intact chorioallantoic membrane of the developing chick embryo is exposed to air sprayed with vaccinia virus the virus can be recovered for at least eight hours.

Investigations of hospital infections, particularly those occurring in contagious disease hospitals, have furnished a second group of data supporting the air borne hypothesis. It is now apparent that such infections constitute a serious problem in these institutions as well as in children's, maternity and other hospitals. A long time ago the contact theory seemed to have been confirmed by the success of the so-called barrier method of nursing

90. Robertson, O. H.; Bigg, E.; Miller, B. F., and Baker, Z.: Sterilization of Air by Certain Glycols Employed as Aerosols, *Science* **93**: 213 (Feb. 28) 1941.

91. Twort, C. C., and Baker, A. H.: Effect of Smoke on Bacteria in the Air, *Lancet* **2**: 587 (Nov. 9) 1940.

92. Twort, C. C.: Bactericidal Aerosols, *Lancet* **1**: 61 (Jan. 11) 1941.

93. Wats, R. C., and Kamat, G. K.: The Destruction of Air Borne Bacteria, *Indian M. Gaz.* **75**: 212 (April) 1940.

94. Cruickshank, R., and Muir, C.: Air Borne Streptococcal Infection Following Influenza, *Lancet* **1**: 1155 (June 29) 1940.

95. Hygiene in Air Raid Shelters: A Discussion at Meeting of Section of Epidemiology of Royal Society of Medicine, *Lancet* **1**: 12 (Jan. 4) 1941.

96. Chapple, C. C., and Kenny, A. S.: Limitation of Bacterial Contamination of Air by a New Automatic Incubator for Infants, *Am. J. Dis. Child.* **57**: 1058 (May) 1939.

97. van den Ende, M.; Lush, D., and Edwards, D. G. F.: Reduction of Dust Borne Bacteria by Treating Floors, *Lancet* **2**: 133 (Aug. 3) 1940.

98. Andrewes, C. H., and others: Control of Air Borne Infection in Air Raid Shelters and Elsewhere, *Lancet* **2**: 770 (Dec. 21) 1940.

in contagious disease hospitals, and so it is curious that the best clinical evidence for the air borne hypothesis has now been furnished by institutions of the same kind. In isolation hospitals, particularly, where cross infections due to streptococci and diphtheria bacilli are most prevalent, organisms similar to the causative ones are now known to be present in the air in relatively large numbers and may be presumed to be of practically undiminished virulence. On the whole the data furnished by recent studies on the spread of hospital infections are most satisfactorily explained by the air borne hypothesis.

The third line of evidence has been given by what might be called a therapeutic test of the air borne hypothesis. Measures designed to rid institutional environments of pathogenic micro-organisms should also reduce the incidence of new infections therein. Sufficient laboratory evidence now exists to indicate that ultraviolet light and chemical sprays, the so-called aerosols, may serve as powerful bactericides. The few reports on clinical trials thus far available contain suggestive evidence that in children's hospitals and operating rooms the use of ultraviolet light reduces the incidence of new infections. Furthermore, several reports indicate that the spread of chickenpox in institutions is inhibited by this means. There has been as yet no detailed report on the clinical application of chemical sprays.

Council on Pharmacy and Chemistry

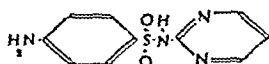
NEW AND NONOFFICIAL REMEDIES

A PRELIMINARY REPORT ON SULFADIAZINE BY THE COUNCIL WAS PUBLISHED IN THE JOURNAL (LONG, PERRIN H.: PRELIMINARY REPORT OF THE COUNCIL, SULFADIAZINE, THE JOURNAL, MAY 24, 1941, PAGE 2399), REVIEWING THE EXPERIMENTAL AND CLINICAL EVIDENCE FOR ITS USE. SINCE THAT TIME OTHER COMMUNICATIONS BY VARIOUS AUTHORS HAVE APPEARED SO THAT THERE NOW EXISTS A MORE COMPLETE KNOWLEDGE OF ITS PHARMACOLOGY AND THERAPEUTIC POSSIBILITIES. PRESENT EVIDENCE INDICATES THAT SULFADIAZINE CAN BE EXPECTED TO GIVE MOST CONSTANT RESULTS IN THE TREATMENT OF INFECTIONS DUE TO DIPLOCOCCUS PNEUMONIAE, HEMOLYTIC STREPTOCOCCUS, MENINGOCOCCUS AND FRIEDLÄNDER'S BACILLUS INFECTIONS, AND STAPHYLOCOCCIC INFECTIONS, GONOCOCCIC INFECTIONS AND URINARY INFECTIONS DUE TO ESCHERICHIA COLI, AEROBACTER AEROGES, STAPHYLOCOCCI. ITS USE IN OTHER CONDITIONS MUST BE CONSIDERED AS STILL IN THE STAGE OF EXPERIMENTAL INVESTIGATION. AFTER CONSIDERING THE EXISTING EVIDENCE THE COUNCIL VOTED TO ACCEPT SULFADIAZINE FOR INCLUSION IN NEW AND NONOFFICIAL REMEDIES. LEDELER LABORATORIES, INC., HAS PRESENTED ITS BRAND OF SULFADIAZINE, WHICH THE COUNCIL HAS FOUND TO CONFORM TO ITS OFFICIAL RULES. ACCORDINGLY, THE COUNCIL DECLARED SULFADIAZINE-LEDELER ACCEPTABLE FOR INCLUSION IN NEW AND NONOFFICIAL REMEDIES.

AUSTIN E. SMITH, M.D., Acting Secretary.

SULFADIAZINE.—2-Sulfanilamidopyrimidine.—2-Sulfanilyl aminopyrimidine.—*p*-amino-N-2-pyrimidyl benzene sulfonamide.— $C_{10}H_{10}N_4O_2S$ (M. W. 250.27).

Sulfadiazine has the following structural formula:



It may be prepared by the reaction of 2-aminopyrimidine with *p*-acetylaminobenzenesulfonyl chloride in the presence of pyridine. The resulting acetylsulfadiazine is hydrolyzed in sodium hydroxide solution, and crude sulfadiazine is obtained by acidifying the mixture with hydrochloric acid. The crude product may be purified by dissolving in alkali, treating with activated charcoal and reprecipitating with hydrochloric acid.

Actions and Uses.—Sulfadiazine is an effective chemotherapeutic agent in the treatment of experimental meningococcal infections, pneumococcal, hemolytic streptococcal, staphylococcal, Friedländer's bacillus, *E. Coli*, *Clostridium septicum* and *Clostridium welchii* infections in mice. Clinically, good therapeutic

results have been reported in the treatment of pneumococcal pneumonia, both lobar and bronchial, and hemolytic streptococcal, meningococcal and Friedländer's bacillus infections, also staphylococcal infections, gonococcal infections and urinary infections due to *E. coli*, *A. aerogenes*, staphylococci.

Sulfadiazine resembles sulfapyridine more closely in respect to its absorption, distribution and excretion than it does sulfathiazole. When the drug is administered orally, its rate of absorption from the gastrointestinal tract is definitely slower and less complete than that of sulfathiazole or sulfanilamide. Sulfadiazine is, as a rule, conjugated to the acetylated form in the blood and tissues to a lesser degree than is sulfanilamide, sulfathiazole or sulfapyridine. That fraction of the drug which is absorbed is excreted mainly by the kidneys in the "free" and conjugated forms, and it appears that one of the reasons why small amounts of the conjugated fraction are found in the blood is that acetylsulfadiazine is excreted more readily by the kidneys than are the conjugated fractions of sulfapyridine or sulfathiazole. The amount of conjugated drug found in the urine is generally less than that noted in the instance of sulfathiazole or sulfapyridine. The excretion of sulfadiazine is in general slower than that of sulfanilamide, sulfapyridine and sulfathiazole, and it may take five or more days after the drug has been stopped before it is completely eliminated from the body. Probably this slower rate of excretion and the fact that only about 50 per cent of the drug passes into the body water explains why it is possible to obtain and maintain adequate therapeutic levels of sulfadiazine with more ease than is the case when sulfapyridine and sulfathiazole are being prescribed. The drug passes over into pleural and abdominal fluids and into the spinal fluid in concentrations of one half to four fifths of that noted in the blood. Sulfadiazine penetrates the red blood cells easily. It is evident from these findings that the drug is somewhat irregularly distributed in the tissues of the body.

Toxicity.—All observers reporting to date have commented upon the relatively low toxicity of sulfadiazine. Nausea and vomiting are not common, dizziness has occasionally been reported, as have also mild mental disturbances. "Peripheral neuritis" (anterior horn cell injury) has not been noted. Acidosis does not occur. Fever and drug rashes are uncommon, occurring in about 1 or 2 per cent of the patients. Hepatitis has not been reported, leukopenia with granulocytopenia is rare and but 1 case of agranulocytosis (occurring toward the end of the third week of therapy) has been noted. Acute or mild hemolytic anemias are very rare; hematuria and more serious kidney damage are uncommon. Because of the possibility of this latter toxic reaction, it is imperative to keep the urine output of an adult patient receiving this drug at 1,000 cc. a day. If severe toxic manifestations of drug therapy arise, sulfadiazine should be stopped and fluids forced in order that the drug may be eliminated from the body as quickly as possible. It has been noted that patients who are suffering from acute toxic reactions from other drugs in the sulfonamide series may be switched to sulfadiazine therapy without much chance that the existing toxic reaction will be prolonged or accentuated by sulfadiazine. Patients treated with sulfadiazine should be carefully supervised by a physician.

Dosage.—Uniform standards of dosage have not as yet been agreed on by investigators who have used sulfadiazine in the treatment of pneumococcal and other infections. However, it is important to establish adequate concentrations of the drug in the blood as soon as is possible after therapy has been initiated. Hence, in adults with pneumococcal pneumonia, a large initial oral dose is given and should be based on 0.10 Gm. per kilogram, to be followed by doses of 1.0 Gm. of the drug every four hours by mouth until the temperature has been normal for seventy-two hours. The drug may then be stopped. Concentrations of 8 to 12 mg. per hundred cubic centimeters of sulfadiazine in the blood seem advisable during the febrile stage of the pneumonia. In children, the initial oral dose should be based on 0.10 to 0.15 Gm. per kilogram of body weight, and subsequent doses should be one quarter of the initial dose given at intervals of six hours until the temperature has been normal for at least forty-eight hours. In mild or moderate hemolytic streptococcal infections, an initial oral dose of 0.05 Gm. per kilogram, followed by a total daily dose based on 0.10 Gm. per kilogram of body weight, this to be divided into six doses and given every four hours by mouth, day and night, until the temperature has been normal for five days, has been suggested as a satisfactory dosage schedule.

In severe streptococcal and in meningococcal and Friedländer's bacillus infections it is necessary, during the febrile period, to

obtain and maintain concentrations of approximately 15 mg. per hundred cubic centimeters of sulfadiazine in the blood of patients. This can be easily obtained by the intravenous administration of 0.1 Gm per kilogram of body weight of the sodium salt of sulfadiazine, made up in a 5 per cent solution in sterile distilled water. If the sodium salt has been administered as the initial dose, subsequent doses of the drug should be administered by the oral route and should consist in adults of 1 Gm every four hours day and night until definite improvement has been noticed. At this time the dosage should be decreased in accordance with the clinical needs of the patient. If the sodium salt of sulfadiazine is not available, the initial oral dose in adults should be, sulfadiazine 0.1 Gm, this to be followed by 1 Gm every four hours day and night until a definite clinical improvement has been noted. At this time the dose of the drug may be decreased in accordance with the patient's needs. In severe infections in children, the initial oral dose should be based on 0.10 Gm. per kilogram of body weight, and subsequent doses should be one sixth of the initial dose, given at intervals of four hours day and night until definite clinical improvement has been noted; at this time the dose of the drug may be decreased in accordance with the patient's needs. Frequent determinations of the concentration of sulfadiazine in the blood should be made, and this should not be permitted to exceed 20 mg. per hundred cubic centimeters, because higher levels are unnecessary. In mild hemolytic streptococcus infections, in adults, sulfadiazine 1 Gm. every four hours day and night until decided improvement appears is generally sufficient to control the infection.

For the determination of sulfadiazine in body fluids, the method developed by A. C. Bratton and E. K. Marshall Jr. (*J. Biol. Chem.* 128:537 [May] 1939) is to be recommended.

Sulfadiazine occurs as a white, odorless, tasteless, crystalline powder. It may be recrystallized from hot water to yield long, flat needles which exhibit birefringence, parallel extinction and a negative sign of elongation when viewed under a polarizing microscope. It is soluble in both alkaline and mineral acid solutions; sparingly soluble in alcohol, acetone and water (0.0123 Gm per hundred cubic centimeters at 37°C); insoluble in ether and chloroform. The melting point of sulfadiazine is 253-255°C, with decomposition.

Place about 0.5 Gm of sulfadiazine in a test tube, wrap the upper portion of the test tube with wet filter paper, insert a thermometer and heat at 240-260°C until a white crystalline sublimate forms in the neck of the tube. The melting point of the crystalline sublimate lies between 120 and 127°C. When recrystallized from hot benzene, the purified 2-aminopyrimidine obtained melts sharply at 126-127°C. (distinction from other sulfanilamide derivatives). Under the polarizing microscope the sublimate appears as long, acicular crystals, exhibiting sharp parallel extinction. The fumes evolved during the decomposition do not discolor moistened lead acetate paper (distinction from sulfathiazole); no odor of ammonia is evolved, and the residue is colored reddish brown (distinction from sulfanilamide and sulfaguanidine, which evolve the odor of ammonia and leave a purple to violet residue).

Dissolve about 0.1 Gm of sulfadiazine in about 0.5 cc tenth-normal sodium hydroxide and dilute to 10 cc with distilled water. Add 5 drops of copper sulfate. An olive green precipitate forms which will change to purple gray on standing (distinction from sulfapyridine, which forms an apple green precipitate that turns olive green, from sulfathiazole, which forms a violet precipitate, from sulfaguanidine, which forms a dark brown precipitate, and from sulfanilamide, which forms no precipitate or a light blue one).

Dissolve 0.5 Gm of sulfadiazine in a mixture of 5 cc of nitric acid and 5 cc of distilled water and add 1 cc of silver nitrate solution; any turbidity produced is not greater than that formed in a control containing 0.1 cc of fiftieth normal hydrochloric acid.

Dissolve 0.5 Gm of sulfadiazine in 5 cc of hydrochloric acid and 5 cc of distilled water and add 1 cc of barium chloride solution; any turbidity produced is not greater than that formed in a control containing 0.1 cc of fiftieth normal sulfuric acid.

Dissolve 1 Gm of sulfadiazine in 6 cc of normal sodium hydroxide, dilute to 20 cc with distilled water, and add 5 drops of freshly prepared 10 per cent sodium sulfide solution; the darkening produced does not exceed that developed in a control test to which has been added 0.02 mg of lead.

Dry an accurately weighed specimen of sulfadiazine to constant weight in a vacuum over phosphorus pentoxide; the loss does not exceed 0.5 per cent.

The nitrogen content of dried sulfadiazine is not less than 22.1 per cent nor more than 22.5 per cent, the sulfur content is not less than 12.5 per cent nor more than 12.9 per cent.

Dissolve about 0.5 Gm of sulfadiazine in 10 cc of distilled water and 10 cc of concentrated hydrochloric acid contained in a 400 cc beaker, dilute to 50 cc, cool to 15°C, and titrate with tenth molar sodium nitrite solution.

The endpoint is the first immediate blue streak obtained when a glass rod dipped into the solution is drawn across a smear of starch iodide paste on white filter paper (or clear glass plate). The solution should return this endpoint for thirty seconds. Each cubic centimeter of tenth molar sodium nitrite corresponds to 0.02503 Gm of anhydrous sulfadiazine; the amount of sulfadiazine found corresponds to not less than 99.5 per cent nor more than 101.0 per cent.

LIDLIE LABORATORIES, INC., PEARL RIVER, N. Y. PATENT APPLIED FOR.

Tablets Sulfadiazine: 0.5 Gm (77 grains).

U. S. patent applied for

Council on Industrial Health

THIS REPORT ON THE TEACHING OF INDUSTRIAL HEALTH HAS BEEN PREPARED JOINTLY BY COMMITTEES REPRESENTING THE AMERICAN ASSOCIATION OF INDUSTRIAL PHYSICIANS AND SURGEONS AND THE COUNCIL ON INDUSTRIAL HEALTH OF THE AMERICAN MEDICAL ASSOCIATION. THE UNDERLYING ARGUMENTS FOR IMPROVED TEACHING OF THE ESSENTIAL FACTORS IN INDUSTRIAL HEALTH HAVE BEEN SUBMITTED TO THE COUNCIL ON MEDICAL EDUCATION AND HOSPITALS, WHICH IN TURN HAS ACKNOWLEDGED THE URGENT NECESSITY FOR CALLING EXISTING DEFICIENCIES STRONGLY TO THE ATTENTION OF MEDICAL EDUCATORS AND THE PROFESSION AT LARGE AND FOR THE SUBMISSION OF SUITABLE RECOMMENDATIONS AIMED AT THEIR CORRECTION.

C. M. PETERSON, M.D., Secretary.

THE TEACHING OF INDUSTRIAL HEALTH

Recent events have made it plain that the health of the industrial worker is vital to national security. Yet with notable exceptions the requirements of industry in the fields of industrial medicine, surgery and hygiene are being met in very incomplete and fragmentary fashion, without clear realization of objectives or their value to the health status of the community as a whole.¹ It is equally clear that the medical profession has been hampered in its approach to this useful and expanding professional activity and will continue to be hampered until adequate provision is made for instruction in modern industrial health methods, both before and after graduation.

PROFESSIONAL GROUPS INVOLVED

Medical service to industry flows through three principal professional channels:

1. The private practitioner in general or special practice serving on call or part time. Best current estimates indicate that 80 to 85 per cent of medical service to industry is supplied in this fashion. As such it has been mainly remedial in character to such an extent that medium sized and small plants have been left without the considerable advantages of preventive industrial medicine and surgery.

2. The full time industrial physician serving in one or several plants who exemplifies specialty practice in industrial health. In addition to prevention and treatment of compensable disability, he is concerned with the details of medical department administration.

3. The medical industrial hygienist more frequently associated with governmental agencies, who provides a consultative and investigative service directly to industry and to the medical profession, as well as enforcement of public health and sanitary codes relating to conditions of work.

In each of these classifications there are definite shortages of well trained personnel.² To meet these varying educational requirements, medical and professional schools and medical societies singly and in combination are under heavy obligation to create or improve opportunities for training in undergraduate and continuation courses and for extended graduate study.

CONTENT AND ORGANIZATION OF TEACHING

Experienced physicians in industry have testified that industrial health activity falls into three principal categories:

1. Industrial medical administration
2. Industrial medicine and traumatic surgery.
3. Industrial hygiene and toxicology.

For physicians who expect to meet the ordinary medical needs of industry, proper grounding in each of these major subdivisions should be provided, begin-

¹ Industrial Medical Education, *J. A. M. A.* 114: 583 (Feb. 17) 1940.

² Annual Congress on Industrial Health—Availability of Trained Industrial Health Personnel, *J. A. M. A.* 116: 1455 (March 29) 1941.

ning in the undergraduate curriculum. The outline which is appended to this report has been prepared in recognition of these basic requirements to a well rounded understanding of industrial health service.

Actually only a few medical schools have made this type of instruction available. Industrial hygiene is widely taught as a relatively minor function of preventive medicine and public health. Problems in industrial medicine and surgery are presented without any relation to prevention and control over exposures and only as examples happen to present themselves in clinics or wards. Industrial medical administration has been almost completely ignored. Yet the experience of a number of medical schools amply demonstrates that reasonable acquaintance with the whole subject can be provided at modest expense through judicious use of time and readily available teaching and clinical material. The all important requirement for improved instruction is a unified plan which assigns over-all responsibility for coordinated classroom discussion, field studies, and laboratory and section work to one single teaching division, preferably preventive medicine and public health. There must always be considerable dependence on clinical teaching in the medical and surgical aspects of industrial practice, but the testimony of recent graduates clearly indicates that older methods of divided and unrelated instruction fail to provide dependable and reasonably complete information.

As a matter of fact, progress would be greatly accelerated if many more medical and graduate schools, especially those in industrial areas, could develop or attract support for the organization of separate teaching divisions in industrial health, each with its own faculty, affiliations for clinical and demonstration material and facilities for laboratory and field investigation and consultation. Good precedent exists for independent organization of this character. Under such an arrangement there should be greatly improved prospects for the attraction of special teaching talent and material, of support for research into a thousand aspects of industrial health crying for investigation and for the promotion of advanced training at graduate and fellowship levels.

PLAN OF INSTRUCTION

The essential requirements for teaching industrial health can most briefly be described as follows:

A. Undergraduate Teaching.

1. Required Courses: These courses should provide lectures, laboratory experience, industrial history taking and record keeping, section work in wards and clinics, and field trips in accordance with the accompanying outline.
2. Elective Courses: Electives should provide opportunity for more detailed and specific study, personal participation in special projects, individual patient study or personal experience in plant or laboratory. Time allotment will vary according to nature and extent of subject matter.

B. Continuation Study.

Since most practicing physicians have had little opportunity for organized instruction, introductory and refresher courses must be provided by universities, county, state and special medical societies or combinations thereof. The accompanying outline can serve as a model suitably modified to fit special requirements.

C. Extended Study.

The detailed course outline can serve as a framework for study, graduate in character, calculated to prepare physicians for full time specialty practice in industrial plants or industrial

hygiene laboratories. Modifications will be necessary at such time as certification for industrial practice develops. More weight must be assigned to administrative details, personnel relations, legal and social medicine, toxicology, pathology, physiology and public health methods. Courses should be designed to establish competence in industrial health in its own right and not as a minor component of advanced teaching in public health.

OUTLINE OF A COURSE IN INDUSTRIAL HEALTH

The outline of a course in industrial health which follows is based on the three major constituents of medical service to employed groups—industrial hygiene, industrial practice and administration. Under each principal heading is incorporated a general statement explaining in broad terms its importance in the teaching program, followed by a more detailed listing of subheadings. Specific recommendations are also presented about teaching methods and facilities.

In general, the recommendations refer to required instruction for undergraduates. For more detailed instruction, suitable additions can readily be made or examples of existing syllabuses may be examined on application.

I. INDUSTRIAL HEALTH ADMINISTRATION

A. General Statement.

Present interest in working conditions and the welfare of workers follows a century of social and labor legislation which has culminated in workmen's compensation and social security enactments. As demands for industrial health supervision increase, physicians will be invited to organize and administer medical departments in factories, mines and stores of all types and sizes. The experience of many physicians in industry demonstrates that service of this nature can operate efficiently, ethically and scientifically and in full recognition of the best interests of worker, employer, official agencies, the general medical profession and the community at large.

B. Organization for Teaching.

With rare exceptions, well conducted industrial medical departments are readily accessible to most teaching centers. Directors of such departments are usually qualified to teach administrative procedure and to demonstrate it directly in the working environment.

About a third of assigned hours should be allotted to administrative methods equally divided between class room discussion and visits to acceptable plant medical departments.

C. Course Content.

1. Origin and Later Development of Industrial Health.
 - (a) Clinical Interest in Occupation and Health.
 - (b) Legislative Background.
 - (1) Factory Acts.
 - (2) Workmen's Compensation.
 - (3) Social Security.
2. Occupational Morbidity and Mortality.
 - (a) Causes and Duration of Lost Time in Industry.
 - (1) General Experience.
 - (2) Experience in Specific Industries.
 - (b) Reportability of Industrial Accidents and Diseases.
3. Distribution of Industrial Health Service.
 - (a) Scope and Objectives of Industrial Health.
 - (b) Population Groups Involved:
 - (1) According to Plant Size.
 - (2) According to Type of Industry.
 - (c) Costs of Medical Service in Industry.
 - (d) Economic and Other Benefits.
4. Classification of Industrial Physicians.
 - (a) On call and part time (detached).
 - (b) Full time (attached).
 - (c) Consulting services.
 - (1) Industrial Hygiene.
 - (2) Clinical Specialties.
 - (d) Qualifications for industrial medical service.

5. The Industrial Medical Department.

- (a) Organization.
 - (1) Personnel.
 - (2) Plant and Professional Relations.
- (b) Quarters and Equipment.
- (c) Specific Functions.
 - (1) Treatment and Hospitalization.
 - (2) Prevention and Sanitation.
 - (3) Health Conservation.
 - (a) Physical Examinations.
 - (b) Health Education.
 - (4) Rehabilitation.
- (d) Special Medical Problems of Small Plants.

II. INDUSTRIAL HYGIENE AND TOXICOLOGY

A. General Statement.

Employers and workers alike look to prevention as the cardinal principle for reducing the incidence of disability in industry. They have learned by experience that health conservation promotes efficiency, earning power and industrial relations. Physicians who serve in industry must be acquainted with dependable means for recognizing and controlling unhealthful occupational risk. The extraordinary development of industrial technology has multiplied these dangerous exposures tremendously. In addition to the procedures related to industrial hygiene and toxicology directly, there are equally important problems associated with adapting industrial medical activity to programs of adult hygiene in official and community health and welfare agencies.

B. Organization of Instruction.

Facilities and personnel necessary for adequate instruction in industrial hygiene are available singly or in combination through access to—

1. Bureaus of industrial hygiene in state or local governments.
2. Departments of biochemistry, physiology, clinical pathology and toxicology in the medical schools.
3. Suitably equipped independent or plant industrial hygiene laboratories.

About one third to one half of available hours should be allotted to industrial hygiene, toxicology giving equal consideration to didactic work and laboratory demonstration.

C. Course Content.

1. Industrial Health Exposures.
 - (a) Classification.
 - (b) Essential Toxicology.
 - (c) Safe Concentration Codes.
2. The Plant Survey.
 - (a) Identification of Exposures.
 - (1) Medical Procedure.
 - (2) Engineering Procedure.
 - (b) Control of Exposures.
 - (1) Medical.
 - (2) Engineering.
 - (c) Maintenance of Control.
 - (d) Records.
3. Plant Sanitation and Hygiene.
 - (a) Water Supply.
 - (b) Waste Disposal.
 - (c) General Housekeeping.
 - (d) Illumination.
 - (e) Ventilation and Air Conditioning.
 - (f) Noise and Vibration Control.
4. Personal Hygiene for Workers.
 - (a) Toilets and Washrooms.
 - (b) Fatigue Control.
 - (c) Nutrition.
 - (d) Housing.
 - (e) Recreation.
5. Coordination of Industrial and Community Health Service.
 - (a) Communicable Disease Control.
 - (b) Industrial Waste Control.

- (c) Vital Statistics.
- (d) Safety Codes and Regulations.
- (e) Factory Inspection and Regulation.

III. INDUSTRIAL MEDICINE AND TRAUMATIC SURGERY

A. General Statement.

Most medical service supplied to or through industry is aimed primarily at the individual worker suffering from compensable disability. Full restoration of the injured worker to his former earning capacity in the same line of work and without unnecessary delay is the ideal objective. The physician in industry must also recognize the considerable preponderance of nonoccupational injuries and disease as a factor in industrial absenteeism and the consequent necessity for proper correlation between industrial and private medical practice. This component of the training should also provide reasonable acquaintance with the industrial application of such commonly employed consulting services as dermatology, ophthalmology, neuropsychiatry, orthopedics, radiology and jurisprudence.

B. Organization of Teaching.

Clinical material in industrial medicine and surgery is abundant in most localities. Special affiliations and arrangements with agencies listed will be necessary:

1. Departments of surgery, medicine and jurisprudence in the medical school and with the principal related surgical and medical specialties (ophthalmology, dermatology, occupational therapy and so on).
2. Industrial outpatient clinics and hospital wards.
3. Industrial medical departments and dressing stations.
4. Workmen's compensation and rehabilitation agencies.

From one third to one half of available time should be assigned to industrial medicine and surgery. Principal emphasis should be placed on individual case study of ambulatory and bed patients with suitable supervision and correlated classroom discussion.

C. Course Content.

1. The Worker and the Job.
 - (a) The Worker:
 - (1) Physical and mental fitness.
 - (2) Aptitude tests.
 - (3) Medicine and personnel relations.
 - (b) The Job:
 - (1) Physical and mental requirements.
 - (2) Duration—hours and wages, day, night, peak loads.
 - (3) Special processes, equipment and working conditions.
 - (4) Environmental factors.
2. Industrial Accidents.
 - (a) Incidence and costs.
 - (b) Classified causes.
 - (c) Emergency care and transportation.
 - (d) Surgical management.
 - (e) Prevention.
 - (f) Estimation of disability.
 - (g) Records.
3. Occupational Diseases.
 - (a) Etiologic classification.
 - (b) Pathology and toxicology.
 - (c) Medical Management.
 - (d) Prevention.
 - (e) Disability evaluation.
 - (f) Records.
4. Nonoccupational Disability.
 - (a) Incidence and costs.
 - (b) Classified causes.
 - (c) Medical advisory service.
 - (d) Follow-up service.
 - (e) Records.
5. Workmen's Compensation and Rehabilitation.
 - (a) Administrative methods.
 - (b) Medical relations and regulation.
 - (c) Insurance practice.

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SATURDAY, FEBRUARY 28, 1942

GERMICIDAL GAS

The use of germicidal vapors for the prevention of air borne infection with influenza has been the subject of recent study by Robertson and his colleagues¹ of the Douglas Smith Foundation, University of Chicago. Demonstration that ferrets are readily infected by air borne influenza virus² has emphasized the possible clinical importance of physical or chemical methods of sterilizing the air. Successful sterilization by the use of ultraviolet radiation has been reported,³ as well as the possibility of killing air borne bacteria and fungi by means of chemical mists (aerosols).⁴ Robertson and his co-workers⁵ found that glycol mists are effective, propylene glycol being the aerosol of choice because of its low toxicity.

Henle and Zellat⁶ of the University of Pennsylvania afterward tested the same mists on influenza virus. Air streams from two atomizers were mixed in a 5 liter bottle. One atomizer contained diluted virus, the other either propylene glycol or water as a control. The concentration of glycol in the 5 liter mixture was approximately 1:200,000, as determined by loss of weight in the second atomizer flask. The virus-glycol mixture was then transferred to an exposure chamber containing 5 white mice. After forty-five minutes' exposure the mice were removed to individual cages. The death rate and the degree of pulmonary involvement of the survivors were determined on the eleventh day.

In control tests with water in the second atomizer, all mice exposed to undiluted virus in the first atomizer died between the sixth and the eleventh day. Half of the mice exposed to a 1:10 dilution of the same virus

died before the eleventh day. In all survivors there were evidences of advanced pulmonary lesions. With a 1:100 dilution of the virus none of the mice died, though all showed some pulmonary involvement. With 1:1,000 dilution none died and but half of them developed pulmonary lesions. A 1:10,000 virus dilution was wholly noninfectious. Compared with this control series, a 90 to 99 per cent reduction in air borne virus infectivity was evident as a result of the presence of the 1:200,000 propylene glycol mist.

Robertson and his co-workers⁷ found that the same glycol is ten times more effective against air suspended bacteria if used in the gaseous form. He afterward found that a 1:2,000,000 dilution of propylene glycol vapor would completely protect mice against dilutions of influenza A virus which regularly kill all control mice within four to ten days. These experiments indicate that 1:2,000,000 propylene glycol gas is an almost perfect germicidal agent when tested against air borne bacteria or air borne influenza virus. A direct clinical application of this experimental evidence, however, has not thus far been suggested by the Chicago investigators.

THE "ESSENCE" OF SULFONAMIDE QUACKERY

Physicians have recently been circularized by the Koch Laboratories, Inc., of 8181 East Jefferson Avenue, Detroit, with regard to an item which is called "1:4 Benzoquinone" or "BQ" and described as one of "Koch's Synthetic Antitoxins." The so-called 1:4 Benzoquinone is designated as the "active principle of the sulfonamide series." In the promotional material for 1:4 Benzoquinone appears a statement that it has been in use since 1922. THE JOURNAL has commented frequently¹ on the promotion of Koch's "Glyoxylide," which he claims was introduced at the same time. Since reference to the promotional material for Glyoxylide does not indicate any active promotion for Benzoquinone, this would seem to be essentially, if not technically, a new drug. The promotional material for 1:4 Benzoquinone (Koch) does not contain any references to medical writings to substantiate the claim that this is the active principle of the sulfonamide series. Neither is there any clinical evidence to support the statement "We recommend 1:4 Benzoquinone in the treatment of all infections, including . . . streptococcus sore throat, pneumonia, undulant fever" and "infantile paralysis" and several other conditions, including "the allergies." In view of prevailing federal drug legislation how can such promotional material as this be used? It is not unusual, however, for the Koch Labora-

1. Robertson, O. H.; Loefer, C. G.; Puck, T. T.; Biggs, Edward, and Miller, B. F.: *Science* 94: 612 (Dec. 26) 1941.

2. Andrews, C. H., and Glover, R. E.: *Brit. J. Exper. Path.* 22: 91 (April) 1941.

3. Wells, W. F. and Henle, W.: *Proc. Soc. Exper. Biol. & Med.* 48: 298 (Oct.) 1941.

4. Twort, C. C., Baker, A. H.; Finn, S. R., and Powell, E. O.: *J. Hyg.* 40: 253 (May) 1940. Andrews, C. H.: *Lancet* 2: 770 (Dec. 21) 1940.

5. Robertson, O. H.; Biggs, Edward; Miller, B. F., and Baker, Zelman. *Science* 93: 213 (Feb. 28) 1941.

6. Henle, W., and Zellat, J.: *Proc. Soc. Exper. Biol. & Med.* 48: 544 (Nov.) 1941.

7. Robertson, O. H.; Biggs, Edward; Miller, B. F.; Baker, Zelman, and Puck, T. T.: *Tr. A. Am. Physicians* 56: 33, 1941.

1. The "Glyoxylide" of William F. Koch, *J. A. M. A.* 107: 19 (Aug. 15) 1936. Koch's "Cure" and the (a) *Am. J. Hyg.* 40: 253 (May 31) 1941. (b) *Canad. J. Hyg.* 40: 253 (May 31) 1941. (c) *Denies Authorization for Circular on Koch Treatment for Cancer*, *Correspondence*, *ibid.* 117: 216 (July 19) 1941.

tories to promote preparations for treatment without the slightest real proof of their usefulness. The recommendation of the drug for such a wide variety of conditions is followed by a paragraph headed "Scientific Basis":

"Accurate catalytic dilutions of 1:4 Benzoquinone activate Oxygen in the tissues, spontaneously forming peroxides that split into Glyoxylide and Malonide, the most efficient catalysts of tissue oxidation that can exist.

"They burn the toxic groups in every pathogenic germ product, making them harmless to the body, and nonsupportive to germ life.

"They restore the tissue oxidations providing the energy for normal dispersion of the tissue colloids, for normal function and growth.

"1:4 Benzoquinone, Glyoxylide and Malonide have proven absolutely harmless since their first use in 1922. They were among our first Synthetic Antitoxins."

If that is scientific basis, it is apparently more confusing than scientific. Next follows a section headed:

"1:4 Benzoquinone (the Active Principle of the Sulfonamide Series). The members of the sulfonamide series may kill or cure. It depends upon whether or not the patient's oxidations are still active enough to burn off the amino group, the sulfonic acid group, and the other characterizing group, and oxidize the benzene ring to 1:4 Benzoquinone."

This astounding statement is wholly unsupported by evidence. The Koch Laboratories then suggests that, even though this Benzoquinone is formed, the balance of the sulfonamide preparation which has not been so converted serves to handicap the action of the Benzoquinone, whereas 1:4 Benzoquinone, in its proper dilutions, "works curatively only." Extravagance in statement proceeds to expansive exaggeration.

"This therapy with Glyoxylide and Malonide [are they the same as 1:4 Benzoquinone?—Ed.] are the most scientific known. Their serviceability is UNIVERSAL and HARMLESS. There are no contraindications. One dose is generally sufficient."

The promotion next discusses "Case Management," which includes a dietary regimen and "good colon hygiene." "The recovery process," it proceeds, "is cyclical with a periodicity of three hours and its multiples, three and a half days and its multiples, and three weeks and its multiples." Is this astrology?

Under the heading of "Economy" one finds the statement "No method of caring for serious sickness compares in economy with this treatment." At \$10 per 2 cc. ampule?

Entirely absent from this promotional material is any reference whatever to the use of the product in human beings or in animals. Nowhere is there any proof that the product has ever been used successfully in any of the conditions for which it is recommended. The statements about this item addressed to the medical profession smack of typical "patent medicine" promotion to the general public. Surely physicians today are sufficiently well educated to disregard such lucubrations.

THE ACCELERATED MEDICAL CURRICULUM

Elsewhere in this issue appears a resolution adopted by the Council on Medical Education and Hospitals of the American Medical Association, which presents its views concerning the acceleration of our medical curriculum in approved medical schools during the war period. The Council emphasizes the importance that each medical school determine for itself whether or not it can initiate such an accelerated curriculum and indicates the factors which may be considered in making the decision. As was stated in a previous editorial in *THE JOURNAL* on this subject, little would be gained by accelerating the medical curriculum if the results included a deterioration of the quality of medical education. Fortunately the Council on Medical Education and Hospitals is prepared to make necessary inspections in order to aid in maintaining our present high standards.

Coincidental with the meeting of the Council on Medical Education and Hospitals and the annual conference, meetings were held of the Association of American Medical Colleges and of the Federation of State Medical Boards. Both organizations also considered the proposals related to acceleration of the curriculum. A special report prepared by the Bureau of Legal Medicine and Legislation of the American Medical Association indicates that some states will have to revise their laws and others the regulations governing licensure for medical practice before it will be possible for students to obtain licenses to practice in such states. The Federation of State Medical Boards proposes to take the necessary steps to meet this difficulty although, obviously, there can be no assurance of the attitudes to be taken by state legislatures or of the time required to bring about necessary changes.

The Association of American Medical Colleges was also concerned with the fact that needy medical students may need help in completing the curriculum when time is not available in a vacation period for the earning of money. Apparently the federal government proposes to lend money to medical students along with students in other branches of learning so that they may complete the curriculum. The circumstances under which money will be lent are still subject to much consideration.

The actions taken emphasize some of the factors involved in acceleration of medical curriculum which were discussed in *THE JOURNAL* in its editorial "Speeding Production of Physicians," published on January 17. No doubt the months of experimentation to come will indicate many details of organization and of teaching and other considerations which will need to be integrated and coordinated with this proposal before it can function smoothly and efficiently. Obviously not all of the medical schools in the United States are going to be able to undertake the accelerated program with equal efficiency, yet the offer of federal funds paid either directly to the student or to the college may stimulate

many to undertake the project nevertheless. Much of the necessary integration and coordination should have been worked out before the proposal was first urged on the colleges.

At a conference of the Association of American Medical Colleges with the Council on Medical Education and Hospitals and with the Board of Trustees of the American Medical Association, held in Chicago on February 18, a liaison committee was appointed which will aid largely no doubt in overcoming some of the difficulties. Equally important will be proper relationship with the Federation of State Medical Boards and with the Association of American Universities, which will also have an interest in this matter. Finally, the Health and Medical Committee in the Office of Defense Health and Welfare, which is charged with coordination of policies relating to medicine, should give the entire matter its consideration. The Offices of the Surgeon Generals of the Army, Navy and Public Health Service and the Office of the Procurement and Assignment Service for Physicians, Dentists and Veterinarians may be able to develop a fairly accurate approximation of the number of trained personnel to be secured. On such an estimate the colleges might be able to base their decisions as to the number of additional students to be educated, the duration of the speeding up process that will be required and the number of prospective medical students of high quality that can be secured.

Current Comment

EXTREME PREMATURITY AND PERSISTENT TUNICA VASCULOSA LENTIS

Occasionally persistence of tunica vasculosa lentis is observed in full term infants. It is usually limited to one eye and is believed to be due to lack of involution, the result of a purely local disturbance. The presence of a grayish white opaque membrane behind each crystalline lens is reported by Terry¹ in a prematurely born 6 months old twin infant. Since this original observation, four similar ones have been observed in the clinic of the Massachusetts Eye and Ear Infirmary. All the infants were premature, all weighed 3 pounds (1.3 Kg.) or less and none presented evidence of hereditary factors. Terry states that it has not been determined whether this abnormal tissue is a persistence of the entire vascular structure of the fetal vitreous or a fibroblastic overgrowth of the persistent tunica vasculosa lentis. He believes that prematurity could be an important factor not only in preventing normal involution due to closure of the hyaloid artery but also in producing an overgrowth of supporting tissue. The occurrence of the condition in a group of five premature infants suggests the existence of some hitherto unrecognized factor in extreme prematurity which favors the development of this condition.

1. Terry, T. L.: Extreme Prematurity and Fibroblastic Overgrowth of Persistent Vascular Sheath Behind Each Crystalline Lens, *Am. J. Ophthalm.* 25: 203 (Feb.) 1942.

THE JAPANESE AND ILLICIT OPIUM TRAFFIC

Paragraph 15 of a booklet of regulations for Japanese soldiers reads as follows:

The use of narcotics is unworthy of a superior race like the Japanese. Only inferior races, races that are decadent, like the Chinese, Europeans and East Indians, are addicted to the use of narcotics. This is why they are destined to become our servants and eventually disappear.

The role played by the "superior" race in the enslavement of the other races through the use of narcotics is revealed in a statement by the Secretary of the Treasury, Mr. Morgenthau (release to the press, January 26). Commissioner of Narcotics Harry J. Anslinger reported to the secretary that he had abundant proof that Japan had defied international commitments by promoting the opium trade. The Japanese officials had three objectives in their traffic: to gain revenue, to corrupt Western nations and to weaken and enslave the peoples of lands already invaded or marked for invasion. Wherever the Japanese army goes, the drug traffic follows. This illicit commerce in "white" drugs is more than tolerated by the Japanese government. It constitutes an important part of its aggressive policy. The extent of this traffic and the conditions engendered by it are truly appalling. According to our narcotic chief, not less than 90 per cent of all the illicit "white" drugs of the world are of Japanese origin, manufactured in the Japanese concession of Tsientsin, in Dairen or in other cities of Manchuria, Jehol and occupied China, and this always by Japanese or under Japanese supervision. The report states that the Japanese concession in Tsientsin has become the heroin center of China proper and of the world, and it is from here that not only the Chinese race but all other countries of the world are being weakened and debauched. The Japanese consulate at Chengchow in Honan acts as a center for the distribution of drugs. The report further states that since the invasion of North China by the Japanese all legal control of the narcotic trade has ceased to exist. This is another form of chemical warfare against the Chinese people as deadly as war gases. Japanese authorities derive revenue from this traffic to cover part of the costs of their invasion of China. The entire situation was aptly summed up in the statement of Lieutenant Commander Fletcher, made in the House of Commons on Dec. 22, 1938: "Pestilence and war are historically associated with each other, but it has been left to the Japanese to find a way of making a pestilence pay for war." This presumably is the "order and peace" and the "benefits of friendly collaboration" that the Japanese military are bringing to the people of China. We are directly concerned in the matter because of an alarming amount of smuggling of the "white" drugs into the United States. The statement reveals that by one gang of traffickers alone enough heroin was smuggled into the United States to supply ten thousand addicts for one year. One shipment seized in Seattle from four Japanese totaled a million shots of morphine. To combat this illicit traffic, a law was enacted by the United States in 1935 imposing heavy fines on the master or owner of any vessel visiting our ports on which unmanifested heroin, morphine or cocaine is found.

MEDICINE AND THE WAR

In this section of The Journal each week will appear official notices by the Committee on Medical Preparedness of the American Medical Association, announcements by the Surgeon Generals of the Army, Navy and Public Health Service, and other governmental agencies dealing with medicine and the war, and such other information and announcements as will be useful to the medical profession.

PAYMENT OF INCOME TAX BY PERSONS
IN MILITARY SERVICE

Although section 513 of the Soldiers' and Sailors' Civil Relief Act of 1940 permits the deferment of the payment of federal income taxes by persons in military service, the moratorium is not automatic. The taxpayer must show that his ability to pay the tax is materially impaired by reason of such service. Proof of that impairment should be submitted at the time the tax return is filed, on a form procurable from the offices of the collectors of internal revenue.

In order that physicians in military service who desire to take advantage of the deferment privilege may know the type of information that must be supplied to justify the request for deferment of the payment of the tax, the form is reproduced below:

STATEMENT OF FINANCIAL CONDITION
(For benefits under Section 513, Soldiers' and Sailors' Civil Relief Act of 1940)

Name.....	Amount of income
Present	tax liability.....
address.....	Occupation before entering
.....	military service.....
1. My present military service began on....., 19...	
for a period which will end on....., 19...	
2. Average monthly salary for the year before entering military	
service \$.....	
3. Average monthly income, other than salary, for same	
year \$.....	
4. Statement of assets and liabilities as of this.....day	
of....., 19...:	
	Fair
	Market
Assets	Value
Cash	\$.....
Accounts receivable	Real estate mortgages
Notes receivable.....	Chattel mortgages.....
Automobiles	Accrued real estate
Stocks and bonds.. ..	taxes
Real estate	Judgments
Other assets	Other liabilities.....
Total assets.....\$.....	Total liabilities.....\$.....
5. Amount per month of military pay, including cash allow-	
ances \$.....	
6. Average per month of all other income (including any amount	
from former employer) received since entering military	
service \$.....	

AFFIDAVIT

I,, being duly sworn,
depose and say that the foregoing list of assets and liabilities
and other information disclosed above are true and complete in
every respect.

Subscribed and sworn to before me
this.....day of....., 19...
.....
(Signature and title of
officer administering oath)
(SEAL)

.....
(Signature of Applicant)

YELLOW FEVER IMMUNIZATION FOR
ALL ARMY PERSONNEL

Immunization of all Army personnel against yellow fever was ordered on February 12 by the War Department.

Secretary of War Henry L. Stimson announced on Feb. 6, 1941 that the Surgeon General of the Army had been directed to vaccinate all soldiers stationed in the tropical regions of the Western Hemisphere, including Panama and Puerto Rico. Soldiers going to those regions, and any other military personnel who desired it, were also vaccinated. This was the first step toward compulsory vaccination against yellow fever by the Army. The present order is a preventive measure designed to make all soldiers available for service in areas where the disease is known to exist.

Immunization of the U. S. Army will be the first large scale vaccinations against the tropical disease ever attempted by a military force. Immunization is accomplished by the subcutaneous injection of 0.5 cc. of diluted yellow fever vaccine. Only one injection is required. Yellow fever vaccine used by the Army consists of a special strain attenuated virus developed through prolonged cultivation in tissue cultures. The material is placed in ampules and is then rapidly frozen, desiccated, sealed and kept in the frozen state until used.

Yellow fever vaccine now being used is prepared in the laboratories of the International Health Division of the Rockefeller Foundation, New York City. Protective vaccinations given soldiers will grant immunity against "jungle yellow fever," which in 1932 was discovered to have its reservoir in jungle wild life. All soldiers are also given routine protective vaccinations against smallpox, typhoid-paratyphoid fever and tetanus.

COOPERATION BETWEEN RED CROSS AND
DEPARTMENT OF WELFARE OF
NEW YORK CITY

Conferences have been held between representatives of the American National Red Cross and the Department of Welfare of New York City in order to examine the task of caring for people suffering from bombing or other enemy activity. It was agreed that the responsibilities of the Red Cross for the care of people made needy by nature and accident caused disasters during peace or war are not affected by this memorandum. With regard to war caused emergencies, unanimous agreement was reached that responsibility for the various activities that need to be undertaken can be defined and allocated as follows:

1. *Rest Centers.*—A first requirement is the establishment of an adequate number of rest centers for the immediate and temporary care of noninjured sufferers of bombing or other beligerent action. This means providing emergency feeding, clothing and overnight sleeping accommodations for those in need of them. The Red Cross will assume responsibility for establishing, equipping and operating these rest centers. The total number and location of the rest centers will be determined after consultation by the Red Cross with the mayor, the Civil Defense authorities and the appropriate city departments.

The Red Cross will assume responsibility for feeding in these rest centers, utilizing facilities in the centers and mobile canteens and other field equipment where needed. Feeding will also be provided for defense workers at the centers and in the field as this may be needed. In the event of emergency situations which may exhaust the Red Cross supplies, the Department of Welfare will provide food from its communal feeding centers by way of temporary supplementation. Clothing will

be provided in the rest centers for those in need of it from Red Cross stocks and, so far as possible, from WPA clothing made available by the Department of Welfare on the request of the Red Cross.

2. Communal Feeding.—The Department of Welfare will assume responsibility for communal feeding by enlarging the facilities which it now maintains for mass feeding, and through other centers as they may be needed. Feeding may also be provided through restaurants on orders issued by the Department of Welfare. This communal feeding will be provided for civilian sufferers of belligerent action at all times when necessary, including the period after they have been assisted in rest centers and before they have been rehoused and established, so as to meet their own living needs.

3. Rehousing—Cash Grants.—The Department of Welfare will assume responsibility for finding housing facilities for those whose dwellings have been destroyed. It is anticipated that, except in extreme emergencies, sufferers from belligerent action will remain in the Red Cross rest centers from a few hours to a maximum of forty-eight hours. The Red Cross will keep the Department of Welfare continuously informed of the persons receiving care in rest centers, and the Department of Welfare will promptly assume responsibility for finding new dwellings. In all cases the Red Cross will continue to give assistance to affected families until the Department of Welfare assumes that responsibility. The Department of Welfare will also provide cash grants, as needed, and clothing. The Red Cross may provide supplemental assistance to that offered by the department, and the department will refer families and individuals to the Red Cross for that purpose. The Red Cross may undertake the repair of homes of those who have suffered from bombing, although major repairs and the rebuilding of homes will probably have to be deferred until after the termination of the war or of the emergency.

4. Registration.—The Red Cross will assume responsibility for providing information concerning civilians who have suffered from bombing or other belligerent action, so that prompt information concerning them can be given in reply to inquiries. The Department of Welfare and other public and private agencies giving any form of care or assistance will furnish a proper registration of such persons to the Social Service Exchange of the Welfare Council. The Red Cross will undertake to secure information through the Social Service Exchange in response to inquiries.

5. Information.—Subject to and in line with over-all plans for the giving of information in the city concerning welfare and social service open to the entire population, the Department of Welfare will be prepared to give information through its central office and its various branch offices throughout the city.

6. In accordance with plans already made, rescue, first aid and emergency medical care are responsibilities of the emergency medical service of the Defense Council. The Red Cross will assist, as requested, by providing emergency ambulances and other facilities, and by providing an adequate number of persons trained in first aid, as well as by training of nurses' aids.

7. As requested by the mayor, the Department of Welfare will undertake to coordinate the work of the private and social welfare agencies along the lines set up in this memorandum.

NORTHWESTERN HOSPITAL UNIT LEAVES FOR ACTIVE SERVICE

Fifty-eight physicians of U. S. Army Base Hospital Unit No. 12, the Northwestern Medical School Unit, left Chicago on February 15 for a short period of training at Camp Custer, Mich., and then for active military service at an unknown destination. One hundred and twenty-five nurses, the attendants and the remainder of the hospital staff had gone to Camp Custer previously. The head of the surgical staff of this unit is Dr. Michael L. Mason and the head of the medical staff is Dr. M. H. Barker. The members of the faculty of North-

western University Medical School and the students entertained members of the hospital unit before their departure at a dinner at which the medical school chorus and the medical school orchestra performed.

LOCAL HEALTH DEPARTMENTS AND ILLINOIS DEFENSE ZONES

Governor Green has signed a new emergency law passed by the special session of the Illinois legislature which empowers the state department of public health to establish and maintain local health departments in areas which the department may define as defense zones. The new law amends that section of the Civil Administrative Code which prescribes the powers and duties of the state department of public health. At the request of any city or incorporated community situated in affected territories, the special wartime state health services may be extended to these municipalities as an aid to their existing local health agencies. According to the state department of public health there are now seven active military and naval establishments in Illinois which may be considered as defense zone centers: Fort Sheridan, Camp Grant, Great Lakes Naval Training Station, Chanute Field, Scott Field, Glenview Naval Air Field and Park's Air College.

AMERICAN COLLEGE OF SURGEONS HOLDS ONE DAY SESSIONS ON MILITARY MEDICINE

A series of special programs on medicine and surgery in military service and in civilian defense will be offered throughout the country to permit participation of medical and hospital professions in every state and the District of Columbia, under a cooperative plan of the U. S. Army, U. S. Navy and the Office of Civilian Defense with the American College of Surgeons. About thirty of these meetings will be held. A similar arrangement is contemplated in Canada. In the United States, meetings are planned in five areas. The first group is as follows:

AREA 1

Monday, March 2: Indiana and Kentucky, Brown Hotel, Louisville.
Wednesday, March 4: Arkansas and Tennessee, Andrew Jackson Hotel, Nashville.
Friday, March 6: Missouri, Jefferson Hotel, St. Louis.
Monday, March 9: Illinois, Stevens Hotel, Chicago.
Wednesday, March 11: Michigan, Statler Hotel, Detroit.
Friday, March 13: Ohio and West Virginia, Deshler-Wallick Hotel, Columbus.

The army will be represented at the meetings in Louisville, Nashville and St. Louis by Brig. Gen. Charles C. Hillman, Chief of Professional Service, Division, Office of the Surgeon General, and in Chicago, Detroit and Columbus by Major Roger G. Prentiss Jr., Medical Corps, Carlisle, Pa. The navy will be represented by Capt. Frederick R. Hook, Chief, Surgical Service of the U. S. Naval Hospital, Washington, D. C. The Office of Civilian Defense will be represented by Dr. William S. Keller, Glendale, Ohio, at the Louisville and Columbus meetings; by Dr. Judson D. Dowling, Birmingham, Ala., in Nashville, and by Dr. John S. Coulter, Chicago, in St. Louis, Chicago and Detroit. The Procurement and Assignment Service will be represented by Major Sam F. Seeley, Washington, Executive Officer, or by a specially appointed delegate.

Other speakers who will take part in the program in the first area are Drs. Irvin Abell, Rettig A. Griswold and Joseph E. Hamilton of Louisville; George W. Crile of Cleveland; George M. Curtis of Columbus; Evarts A. Graham, Vilray P. Blair and James B. Brown of St. Louis; Carl E. Badgley, Frederick A. Coller and Max M. Peet of Ann Arbor; Grover C. Penberthy of Detroit; Willis D. Gatch of Indianapolis; Edward William Alton Ochsner, Ambruse H. Storck and Michael E. DeBakey of New Orleans; Frederic A. Besley of Waukegan; Warren H. Cole, William R. Cullbins, Loyal Davis, Sumner L. S. Koch and Dallas B. Phemister of Chicago.

Among the subjects to be discussed in the program for the medical profession are treatment of war injuries to the skull and face; treatment of war injuries to the chest; the doctor and the hospital in civilian defense; treatment of wounds of soft parts; prevention and treatment of hemorrhage; treatment of burns and the prevention and treatment of shock. Every phase of hospital service, organization and maintenance will be treated in the program for hospital representatives.

PROMOTIONS IN THE NAVY

The President of the United States has approved the recommendations of the Medical Corps Selection Board which convened in the Navy Department in Washington, D. C., on January 5 and selected one hundred and thirteen naval officers of the rank of lieutenant for advancement to the rank of lieutenant commander and sixty-seven officers of the rank of lieutenant (j. g.) for advancement to the rank of lieutenant.

Following is a list of the officers recommended for promotion and their home addresses.

FOR LIEUTENANT COMMANDER

Douglas T. Pehn, Wausau, Wis.
James J. V. Cammis, Boston.
Charles L. Ferguson, Waynesville, N. C.
Arthur W. Eaton Jr., Denver
Cecil H. Cogins, Philadelphia
William M. Silphant, San Francisco
Robert W. Bibione, Luckey, Ohio
Allan S. Chrisman, Charlotte N. C.
Calvin B. Galloway, Wyandotte, Mich.
Frank P. Kreuz Jr., Menominee, Mich.
James R. Reid Jr., Chester, S. C.
Austin J. Walter, Wheeling, W. Va.
Eugene V. Jobe, Eupora, Miss.
Albert H. Staderman, Philadelphia.
Paul M. Crossland, San Diego, Calif.
Alton C. Abernethy, Altus, Okla.
Earl F. Evans, New Orleans.
Walter H. Schwartz, Burlington, Iowa.
Armand J. Pereyra, San Francisco.
George N. Rames, Jackson, Miss.
William V. Clark, Lineville, Ala.
Edward T. Knowles, Oakland, Calif.
Lyle A. Newton, Hollinger, Neb.
James L. Holland, Meridian, Miss.
George T. Blodgett, Little Rock, Ark.
Judson A. Millsbaugh, Jacksonville, Fla.
Albert W. Eyer, Washington, D. C.
John T. Smith, New Rochelle, N. Y.
Martin Van Brown, Carbondale, Ill.
Joseph V. Land, St. Louis.
Cecil L. Andrews, Greenfield, Ind.
Oran W. Chenault, England, Ark.
David C. Gaede, Loma Linda, Calif.
Robert A. Cooper, St. Paul.
Cecil D. Riggs, Philadelphia.
Jerry T. Miser, Alhambra, Calif.
Philip S. McLennan, Decatur, Ga.
Edwin B. Coyl, San Diego, Calif.
Ralph K. Hoch, Woodside, Del.
Freeman C. Harris, Benton, Ill.
Thomas L. Allman, Milford, Ind.
Raphael L. Weir, Dickinson, N. D.
Edgar L. Nefflen, Elkins, W. Va.
Otto W. Wickstrom, Cambridge City, Ind.
Elmer L. Caveny, Atlanta, Ga.
Gordon H. Ekblad, St. Paul.
Ernest C. Auils, Orlando, Fla.
Robert C. Boyden, Washington, D. C.
Robert C. Douthat, Kansas City, Kan.
Edward P. Madden, Salida, Colo.
Clifford F. Storey, Houston, Texas.
Julius C. Early Jr., Aulander, N. C.
Frederick R. Lang, Philadelphia.
Clark G. Grazier, Philadelphia.
John M. Wheelis Jr., San Diego, Calif.
William L. Engelman, Rockwell City, Iowa.
Robert L. Ware, Drexel Hill, Pa.
Robert A. Bell, Lone Tree, Iowa.
John J. Wells, Somerville, Mass.
Murphy K. Cureton, Rising Fawn, Ga.
Alvin J. Cerny, Chicago

George B. Ribble, La Moure, N. D.
Paul K. Perkins, Chapell Hill, N. C.
Edward F. Kline, Lakewood Village, Calif.
Otto E. Van Der Aue, Chicago.
Howard K. Sessions, Sumner, Ga.
Langdon C. Newman, Covington, Ky.
Victor G. Colvin, Schellsburg, Pa.
Donald O. Wissinger, Logansport, Ind.
Adrian J. Delaney, Richmond Hill, N. Y.
Fitz John Weddell Jr., Storkville, Miss.
Ralph D. Handen, Kingsville, Texas.
Leslie D. Ekvall, La Grange, Ill.
Ernest M. Wade, San Diego, Calif.
Joseph La Monte Zundell, Salt Lake City.
Giffin C. Daughtridge, Rocky Mount, N. C.
Benjamin G. Feen, Atlanta, Ga.
Harold J. Cokely, Rock Port, Maine.
Clarence F. Morrison, Sutton, W. Va.
James A. Price, Galveston, Texas.
Lawrence E. Bach, Washington, D. C.
John Henry Ward Jr., San Diego, Calif.
Ralph M. McComas, Peach Creek, W. Va.
Malcolm W. Arnold, Sardis, Miss.
Thomas L. Wilmon, Cleborne, Texas.
James J. Saperio, Denver.
Francis K. Smith, Barrington, Ill.
James B. Butler, Swedesboro, N. J.
Andrew Galloway, John City, Ill.
George R. Hogshire Jr., Portland, Ore.
Marcy Shupp, Kansas City, Kan.
Frank Alexander Latham, Pontococ, Miss.
Eugene Rudolph Hering Jr., Shell Lake, Wis.
Erwin Herbert Osterloch, Nordheim, Texas.
Charles D. Bell, Minneapolis.
Paul Monroe Hoot, Ponca City, Okla.
Morris M. Rubin, Pasadena, Calif.
Louis M. Harris, Corpus Christie, Texas.
Charles R. Moon, Nashville, Ark.
Thomas W. McDaniel Jr., Broughton, Ark.
Stephen E. Flynn, Butte, Mont.
Harold L. Gillespie, Gradd Range, Mont.
Frank R. Urban, Riverside, Ill.
Edgar Risen, Portland, Ore.
Paul Peterson, Vesson, Miss.
Alton Reginold Higgins, Lewiston, Maine.
Luther George Bell, Edgefield, S. C.
David H. Davis, Kansas City, Kan.
Lewis T. Dorgan, Great Bend, Kan.
Richard S. Silvis, Wagner, S. D.
Oscar Schneider, Hollywood, Calif.
Clifford P. Powell, Auburn, Ala.
Julian M. Jordan, Chicago

FOR LIEUTENANT

Robert V. King, Lebanon, Mo.
George J. Kohut, Dickson City, Pa.
Ralph C. Parker, Jr., Batavia, N. Y.
William T. Foley, Flushing, N. Y.
Eldon C. Olson, McIntosh, S. D.
Robert F. Bruner, Powersville, Mo.
Boris Schuster, Stoughton, Wis.
Louis F. Duly, Baltimore.
Ralph B. Berry, Tindall, S. D.
Joseph J. Zuska, Chicago.
Pelvie H. Oeko, Atlanta, Ga.
Irene E. Miller, Shelby, Ohio.
Ronald B. Finkboner, Ruhl, Minn.

Robert B. Jameson Jr., Newton Center, Mass.
Karl J. Palmberg, Red Oak, Iowa.
Norman S. Hunt, Milwaukee.
Robert B. Johnson, York, Neb.
Howell E. Wiggins, Galtquah, Okla.
William S. Wray, Northfork, W. Va.
Chalmers R. Carr, Mooresville, N. C.
Thomas M. Foley Jr., Washington, D. C.
George L. Calva, Fond du Lac, Wis.

Francis W. Gros, Erie, Pa.
Joseph J. Blanch, Philadelphia.
George T. Ferguson, Kansas City, Mo.
Robert B. Greenman, New Lenox, Ill.
Joseph L. Yon, Charlottesville, Va.
Ralph W. Geise, Sunbury, Pa.
Roald N. Grant, Madison, Wis.
Edward L. Hammond, San Antonio, Texas.
Edward A. Anderson, Des Moines, Iowa.
Sylvester F. Williams, Wilmington, Ill.
William F. Queen, Louisa, Ky.
John W. Koett, Pittsburgh.
Derrick C. Turnpseed, Fitzpatrick, Ala.
William W. Ayres, New Orleans.
Bruno O. Junnla, Gheen, Minn.
Robert O. Canada Jr., Grottoes, Va.
Paul J. Ritchie, Los Angeles.
James A. Grindell, Mukwonago, Wis.
John D. Walters, Uniontown, Pa.
Marcellus C. Shurtleff, Strang, Neb.
Edward F. Szlosek, Nashua, N. H.
J. Francis Richardson, Cape Charles, Va.

Lamar B. Harper, Hyattsville, Md.
James E. Eppley, Princeton, Wis.
Arthur J. Vandergrind, Washington, D. C.
Peter P. Machung, Nanticoke, Pa.
Joseph M. Picciochi, Olyphant, Pa.
Norman L. Barr, Boyle, Miss.
Robert H. Mershon, Los Angeles.
Clement D. Burroughs, Little Rock, Ark.
Frederic G. Hirsch, Toledo, Ohio.
George W. Mast, Memphis, Tenn.
Emmett F. Norwood, Bremerton, Wash.
Vernon E. Martens, St. Louis.
Walter F. Berberich, San Pedro, Calif.
Shirley A. Fuhring, Washington, D. C.
Robert G. Gilbert, Rome, Ind.
Nicholas M. Musco, Washington, D. C.
Edward F. Ritter Jr., Mattoon, Ill.
John S. Shaver, Corsicana, Texas.
Leslie G. Seebach, Minneapolis.
John T. Cangelosi, Dunkirk, N. Y.
Wallace E. Allen, Modesto, Calif.
Lewis S. Sims Jr., Waynesboro, Ga.
Robert C. Ray, Garrison, N. D.

MEDICAL PREPAREDNESS IN CUBA

A committee on medical preparedness has been organized for the war, under the direction of Dr. Pedro L. Fariñas. This committee is integrated by delegates of the following medical organizations:

Academia de Ciencias Médicas, Físicas y Naturales de la Habana
Sociedad de Estudios Clínicos de la Habana
Sociedad Nacional de Cirugía
Sociedad Cubana de Dermatología y Sifilogía
Sociedad Cubana de Cardiología
Sociedad Cubana de Oftalmología
Sociedad Cubana de Tisiología
Sociedad Cubana de Urología
Sociedad Cubana de Pediatría
Sociedad de Gastroenterología
Sociedad Cubana de Hematología
Sociedad de Obstetricia y Ginecología
Sociedad Cubana de Cancerología
Sociedad de Microbiología
Sociedad Cubana de Oto Laringología
Sociedad de Radiología
Sociedad Cubana de Medicina Preventiva
Sociedad Cubana de Ortopedia
Instituto Finlay
Sociedad de Enfermedades del Tórax
Sociedad Cubana de Salubridad Pública
Consejo Superior de Tuberculosis
Escuela de Medicina
Sanidad Municipal
Sociedad de Estudios Clínicos de Santiago de Cuba
Sociedad de Medicina y Cirugía de Santiago de Cuba
Sociedad de Estudios Clínicos de Camaguey
Sociedad de Medicina y Cirugía de Santa Clara
Sociedad de Medicina y Cirugía de Mantanzas
Sociedad de Estudios Clínicos de Cienfuegos
Colegio Estomatológico Nacional
Colegio Estomatológico de la Habana

Some other organizations closely related to the medical profession have been incorporated in the committee, including nurses, pharmacists and some others whose help has been considered valuable, as the Reporters' Association and women's social clubs. The work to be accomplished has been divided among six subcommittees, on Foods and Nutrition, Medical First Aid, Pharmacy, Preventive Medicine and Public Health, Technical Training and Medical Mobilization. A series of conferences was initiated. The first session took place at the Academy of Sciences on January 23 with a large attendance. A paper was read by Dr. Moises Chediak on "National Organization of the Services of Blood Transfusion" and one by Dr. Guillermo García López on "Importance of the Official Measures Aiming to Guarantee an Adequate Ration for the Population in All Possible Emergencies."

A complete overhauling of records has been undertaken. Questionnaires have been sent to the four thousand physicians who are members of the federation, and the results will be classified. Courses are organized for the technical training of young physicians, nurses and women, and attention is being given to those measures of preventive medicine, taking advantage of the national organization and coordinating with medical colleges in all municipalities of the island.

OPTICAL UNITS TO ACCOMPANY ARMIES IN THE FIELD

Mobile optical units which will accompany armies in the field have been organized, the War Department announced on February 11. Under a recently established policy, spectacles are supplied to soldiers without cost. This service will not be confined to bases behind the lines. Each optical unit will be compactly housed in a standard $2\frac{1}{2}$ ton truck, which will be its base of operations as well as its means of transportation. A wide assortment of semifinished lenses will be stocked. These, as required, will be cut down to size, shaped, smoothed and beveled by equipment carried in the truck. Five men will operate each truck, which will carry twelve thousand pairs of lenses, eight thousand four hundred frames, six hundred pairs of extra temples and twelve hundred spectacle cases.

A single unit of this type will have a production capacity of sixty pairs, or one hundred and twenty single lenses, daily, which is estimated to be sufficient for the average requirements of an army of three hundred thousand men.

During the World War the Army maintained a base optical unit in Paris, which filled twenty-two thousand prescriptions for glasses in its four months of operation. Records disclose a close correlation in the percentage of military personnel requiring glasses then and now.

On the basis of experience tables of the principal optical suppliers of America, it is estimated that 99 per cent of spectacle requirements can be supplied by the assortment of lenses carried in the mobile units. Requirements of an extraordinary nature can be temporarily filled until supplied from the rear.

One of the mobile optical units has already been supplied, and negotiations are now under way to procure equipment for five more units.

NURSE SLAIN BY JAPANESE

According to the Presbyterian Hospital Bulletin of the City of Chicago, an Associated Press dispatch from Chungking, China, dated January 16 indicated that the Japanese had slain all American missionaries on Hainan, Chinese island, after the outbreak of war in the Pacific, including registered nurse Miss M. Burkwall, who graduated from the nursing school of the Presbyterian Hospital in 1931. Miss Burkwall's brother graduated from Rush Medical College in 1931 and since then has practiced in China.

R. O. T. C. SUMMER CAMPS TO BE DISCONTINUED AT CARLISLE BARRACKS

The commandant of the Medical Field Service School, Carlisle Barracks, announced on February 13 that the Reserve Officers' Training Corps summer camps at the Medical Field Service School at Carlisle Barracks, Pa., will not be held next summer. The summer camps, which have been conducted at the Carlisle Post every summer since 1921, included students from some of the most important medical schools in the country. Many other shortened courses have been instituted at the various army service schools, particularly the Medical Field Service School, for training of personnel.

ARMY RESERVE OFFICERS ORDERED TO ACTIVE DUTY WAR DEPARTMENT

The following additional medical reserve officers have been ordered to extended active duty by the War Department, Washington, D. C.:

BINKLEY, Frank Carlton, 1st Lieut., Los Angeles
BLUMBERG, Richard W., 1st Lieut., Nashville, Tenn.
BRACKEN, Frank L., 1st Lieut., Johnstown, Pa.

THIRD CORPS AREA

The following additional medical reserve corps officers have been ordered to extended active duty by the Commanding General, Third Corps Area, which comprises the states of Pennsylvania, Virginia, District of Columbia and Maryland:

BASTACKY, Morris, 1st Lieut., Pittsburgh, Fort George G. Meade, Md.
BRINSFIELD, Irving Carlton, 1st Lieut., Vienna, Md., Carlisle Barracks, Pa.
CROOK, Arthur Bascom, 1st Lieut., Philadelphia, Carlisle Barracks, Pa.
DEGNAN, Philip Augustus, 1st Lieut., Washington, D. C., Fort George G. Meade, Md.
DOBBS, George, 1st Lieut., Washington, D. C., Fort Belvoir, Va.
DRAPER, William Bateman, 1st Lieut., Boonsboro, Washington County, Md., Fort Belvoir, Va.
FRANK, David, 1st Lieut., Philadelphia, Aberdeen Proving Ground, Md.
GELLER, Edward Irwin, 1st Lieut., Philadelphia, Fort Belvoir, Va.
HANSELL, Robert Joseph, Captain, Philadelphia, Camp Lee, Va.
HEIMBACH, James Alvin Major, Altoona, Pa., Fort Belvoir, Va.
HENNING, Roger Ellsworth, 1st Lieut., Washington, D. C., Carlisle Barracks, Pa.
HOPKINS, Jesse Bruce, 1st Lieut., Bridgewater, Va., Camp Lee, Va.
JACOBS, Robert Samuel, 1st Lieut., Washington, D. C., Fort Eustis, Va.
JOHNSON, Walter Brenaman, 1st Lieut., Cumberland, Md., Fort George G. Meade, Md.
KATSUKI, David Ichio, 1st Lieut., Philadelphia, Aberdeen Proving Ground, Md.
KILLIUS, William Joseph, 1st Lieut., Johnstown, Pa., Camp Lee, Va.
KOEING, Arthur Rudolph, Captain, Pittsburgh, Fort Story, Va.
KOUGH, Othello Springer, 1st Lieut., Uniontown, Pa., Aberdeen Proving Ground, Md.
KOSSOW, Maurice J., 1st Lieut., Washington, D. C., Fort Belvoir, Va.
LITCHBURN, David Thomas, Major, Washington, D. C., Fort George G. Meade, Md.
LOGAN, Thomas Megoawan, Captain, Philadelphia, Fort Eustis, Va.
McCENEY, Robert Sadler, 1st Lieut., Laurel, Md., Camp Lee, Va.

IMLER, Allison E., 1st Lieut., Philadelphia
LYLE, John S., 1st Lieut., Concord, N. H.
NADEAU, Alexandre T., 1st Lieut., Pascagoula, Miss.
PALITZ, Laurence L., 1st Lieut., New York
POLAN, Charles G., 1st Lieut., Minneapolis
SELLEN, Joseph L., 1st Lieut., Prunedale, Ala.
VAN VLACK, Hall Glesnor, Lieut. Colonel, Jamestown, N. Y.

McNEILL, Willard Payne, 1st Lieut., Takoma Park, Md., Fort Belvoir, Va.
MAXWELL, James Dinsmore, 1st Lieut., Washington, Pa., Carlisle Barracks, Pa.
MELORE, Patrick Ralph, 1st Lieut., Philadelphia, Carlisle Barracks, Pa.
MILLER, Beveridge, Captain, Washington, D. C., Camp Lee, Va.
MINADEO, Anthony Ralph, 1st Lieut., Erie, Pa., Camp Lee, Va.
MONTGOMERY, Edward Samuel, 1st Lieut., Tarentum, Pa., Fort Monroe, Va.
OMBRES, Severn Richard, 1st Lieut., Meadville, Pa., Fort Myer, Va.
PRICE, Weldon Aubrey, 1st Lieut., Arlington, Va., Camp Lee, Va.
PUGH, James Edwin, 1st Lieut., Yeadon, Pa., Edgewood Arsenal, Md.
REILLY, Francis St. Clair, Major, Blairsville, Pa., Aberdeen Proving Ground, Md.
ROYE, Wyatt Earle, 1st Lieut., Covington, Va., Fort George G. Meade, Md.
SALASKY, Milton, 1st Lieut., Norfolk, Va., Fort Belvoir, Va.
SATTERTHWAITE, Richard Wampler, 1st Lieut., Baltimore, Carlisle Barracks, Pa.
SAUL, Theodore Joseph, 1st Lieut., Dushore, Pa., Edgewood Arsenal, Md.
SPALDING, Henry Cannon, Captain, Richmond, Va., Fort Myer, Va.
SPANUTH, John Roy, Captain, Reading, Pa., Aberdeen Proving Ground, Md.
SWITT, Shelley Allender, 1st Lieut., Philadelphia, Carlisle Barracks, Pa.
WARREN, Charles Weston, 1st Lieut., Upperville, Va., Camp Lee, Va.
WHITE, Matthew James Walter, Jr., 1st Lieut., Iuris, Va., Fort Belvoir, Va.

Orders Revoked

BATTAGLIA, Frederick I., 1st Lieut., McKeesport, Pa.
BENNY, Oliver Robert, Captain, Pittsburgh
BRINDISI, Gretano, 1st Lieut., Philadelphia
DITCHBURN, David Thomas, Major, Washington, D. C.
HAZLETT, Frank D., Captain, Washington, Pa.
ROGERS, William H., 1st Lieut., Leesville, Pa.
SAGERSON, Robert P., 1st Lieut., Joliet, Ill., Pa.

ORGANIZATION SECTION

MEDICAL LEGISLATION

DISTRICT OF COLUMBIA

Changes in Status.—S. 2154 has been reported to the Senate, proposing to amend the healing arts practice act of the District of Columbia by imposing a citizenship requirement on applicants for licenses to practice the healing art. H. R. 6483 has passed the House, proposing to authorize the appropriation of \$50,000,000 to enable the Federal Works Administrator to provide in and near the District of Columbia such housing, public works and equipment therefor, including hospitals and other places for the care of the sick, as may be necessary to relieve shortages due to defense activities.

MEDICAL BILLS IN CONGRESS

Change in Status.—H. R. 6548 has passed the House and Senate, making appropriations to supply deficiencies in certain appropriations for the fiscal year ending June 30, 1942. This bill, among other things, appropriates an additional sum of \$2,500,000 for use by the United States Public Health Service in venereal disease control work. Of this amount \$2,250,000 will be allotted to the states. An additional sum of \$600,000 is appropriated for use by the United States Public Health Service for the training of nurses, an additional sum in the amount of \$1,295,000 for emergency health and sanitation activities and an additional amount of \$77,481 for disease and sanitation investigations.

Bills Introduced.—S. 2246, introduced by Senator Maybank, South Carolina, proposes to extend the benefits of the Soldiers' and Sailors' Civil Relief Act of 1940 to all persons who are registered under the Selective Training and Service Act of 1940, as amended, and are classified thereunder after physical examination as being available and fit for general military service. S. 2261, introduced by Senator Doxey, Mississippi, proposes to extend the benefits of the Soldiers' and Sailors' Civil Relief Act of 1940 to any obligation incurred by a person on or after the date of the enactment of the act and prior to the commencement of his period of military service if (1) such obligation is secured by a mortgage, trust deed or other security in the nature of a mortgage on a dwelling house owned by such person at the commencement of this period of military service and still so owned by him; (2) such house is used by his family or other dependents as a home; and (3) such mortgage, deed or other security is insured under the National Housing Act, as amended. H. R. 6527, introduced by Representative Case, South Dakota, proposes that persons who have served in the armed forces of the United States since Dec. 6, 1941 and prior to the cessation of hostilities in the present war shall be entitled to receive the same domiciliary or hospital care, including medical treatment, as is provided by law or veterans' regulations for veterans of the World War in like cases.

STATE MEDICAL LEGISLATION

Kentucky

Bills Introduced.—H. 207 proposes to provide for state reimbursement to hospitals for services rendered to indigents injured in motor vehicle accidents. A hospital is defined as any institution registered and approved by the state board of health which receives and cares for patients suffering from motor vehicle injuries. H. 242 proposes to provide for the licensing, inspecting and regulating by the state board of health of all hospitals and clinics within the state. Hospital is defined as "any institution which maintains and operates organized facilities for the diagnosis, care or treatment of human illness or injury, including convalescence and care during pregnancy, where persons may be admitted for overnight stay or longer." Clinic is defined to mean "any place, except the private office of a person holding a valid certificate as a duly licensed practitioner of

the healing art, in which are maintained and operated organized facilities for the diagnosis or treatment of human illness or injury, or conduct of physical, mental or obstetrical examinations, which serves only persons who remain in said place for less than overnight stay." H. 248, to amend the pharmacy practice act, proposes that nothing in the act shall prevent any person from compounding or manufacturing his own particular product if such person has had fifteen years' or more experience in the compounding or manufacturing of his own particular products under the immediate supervision of a registered pharmacist, or if such person compounds or manufactures his own product under the immediate supervision of a registered pharmacist, or under the supervision of a graduate chemist of recognized standing, after the formula for such product has been approved by the state board of health. H. 315 proposes to exempt from the operation of the uniform narcotic drug act the "administering, dispensing, or selling at retail of any medicinal preparation that contains in one fluid ounce or if a solid or semisolid preparation, in one avoirdupois ounce, not more than one grain of codeine or of any of its salts." The present law exempts from the operation of the act the prescribing, administering, dispensing or selling at retail of any medicinal preparation that contains in 1 fluidounce, or, if a solid or semisolid preparation, in 1 avoirdupois ounce, not more than 2 grains of opium, not more than $\frac{1}{4}$ grain of morphine or of any of its salts, not more than 1 grain of codeine or of any of its salts, not more than $\frac{1}{8}$ grain of heroin or of any of its salts, and not more than one of any of said drugs.

Bill Enacted.—S. 35, to create city and county boards of health in counties containing a city of the first class, provides, among other things, for the maintenance of laboratories and clinics necessary for the public health and for the maintenance of a psychiatric clinic. The director of health must be a physician, qualified as a public health administrator and shall be duly qualified and licensed, or eligible for license, as a medical practitioner in Kentucky.

Michigan

Bills Introduced.—H. 15-XX, to amend the communicable disease control act, proposes that it shall be the duty of the state commissioner of health to manufacture, purchase and distribute to health officers and health boards of counties, cities, villages and townships within the state, on requisition, antitoxin, biologic products and other products for use in the control of communicable diseases. H. 16-XX proposes to provide for the compulsory detention and treatment of any person afflicted with venereal disease who has either failed or refused to comply with any order of the state commissioner of health or who is unable or unwilling to conduct himself and to live in such a manner as not to expose members of his family or household or other persons with whom he may be associated or come in contact to danger of infection. The bill proposes that the probate court of any county may enter an order directing that such person be admitted to an approved hospital or institution established for the care of persons suffering from venereal disease; but the individual may not have denied to him the right to select the physician or the mode of treatment of his choice. Where such individual is unable to pay, the cost of the treatment may be made a charge against the county from which the person is committed; otherwise the person may be made to pay all or such part of the expenses as he is able to bear. The bill further provides that any physician discovering a case of venereal disease shall report same within twenty-four hours on blanks furnished by the state commissioner of health.

Bills Passed.—The following bills passed the senate, February 17: S. 16-XX, proposing that the cost of hospital services and materials furnished in the care of afflicted children shall not exceed a maximum of \$5 per day, and S. 17-XX, proposing that

the hospital rate for services, appliances and other necessities furnished to crippled children shall not exceed the sum of \$5 per day.

New Jersey

Bill Introduced.—S. 70 proposes to enlarge the state board of health to thirteen from twelve members and proposes that at least one member of such board be an optometrist.

New York

Bills Introduced.—S. 627, to amend the workmen's compensation law, provides for the rendering of dental care to an injured employee by any dentist selected by the employee. S. 664, to amend the workmen's compensation act, would authorize the industrial board to make an award to a physician or a hospital for medical care in amounts claimed or decided by an arbitration committee. S. 680, to amend the education law, proposes that x-ray diagnosis be deemed the practice of medicine and defines x-ray diagnosis as "that method of medical practice in which demonstration and examination of the normal and abnormal structures, parts or functions of the human body are made by use of x-rays, and any person who holds himself out to diagnose or able to make or makes any interpretation or explanation by word of mouth, writing or otherwise of the meaning of a fluoroscopic or registered shadow or shadows of any part of the human body made by the use of x-rays, and also the use of x-rays or radium for the treatment of any human ailment." S. 697 proposes an appropriation for the state department of health for use in furthering and promoting a broad nutrition program throughout the state, including the combating of food fadism. S. 847, to amend the judiciary law and the civil practice act, proposes to authorize a judge to appoint one or more physicians to examine an injured person and to furnish a written report thereof. The bill also makes provision for the payment of a reasonable fee to such experts. S. 788 and A. 964, to amend the insurance law, would authorize the writing of insurance against an obligation of the insurer to pay medical, hospital, surgical and funeral benefits to injured persons, irrespective of legal liability of the insured. A. 747 would amend the uniform narcotic drug law by exempting therefrom administering, dispensing or selling at retail of Stokes expectorant or Browns mixture, or any medicinal preparations other than Stokes expectorant or Browns mixture that contains in 1 fluid-ounce, or, if a solid or semisolid preparation, in 1 avoirdupois ounce, not more than 1 grain of codeine or of any of its salts. A. 803, to amend the civil rights law, proposes that no person shall be deprived of any right to exercise a license to engage in any profession, trade, business or calling because of service in the armed forces of the United States during the period of

the present war, or for six months after his discharge from such service. A. 895, to amend the unemployment insurance act, proposes that "if an employee become sick or incapacitated after he has begun to receive benefit payments, he shall continue to receive such payments upon presentation of a doctor's certificate showing such sickness or incapacitation, until such time as he is able to again report to the unemployment insurance office or has received his maximum allocation of payments."

South Carolina

Bill Introduced.—H. 1192, to amend the law relating to the issuance of marriage licenses, proposes as a condition precedent to the issuance of a license to marry that each party to a proposed marriage present a certificate signed by a licensed physician that the party is (1) free from venereal disease and tuberculosis in an infectious or communicable stage, (2) of sound mind, (3) not subject to epileptic fits and (4) not an idiot or an imbecile.

Virginia

Bills Introduced.—S. 178, to amend the insurance law, proposes to authorize corporations issuing motor vehicle liability insurance to add endorsements thereto for the issuance of medical, surgical, ambulance or hospital payments to the insured. S. 189, to amend the medical practice act, proposes to authorize the state board of medical examiners to admit to examination all applicants who have completed in not less than thirty-two months the four courses of at least eight months each required by the present law. Under the present law such four courses must have been given in four different calendar years. S. 125, to amend the workmen's compensation act, proposes to make compensable some twenty-five stated occupational diseases.

OFFICIAL NOTES

THE ATLANTIC CITY SESSION

Hotel Reservations

Fellows of the Scientific Assembly of the American Medical Association who expect to attend the annual session of the Association in Atlantic City, June 8-12, are urged to make their hotel reservations at the earliest possible time. For such reservations please send your first, second and third choice for a hotel reservation to Dr. V. Earl Johnson, Chairman of the Hotel Committee, 16 Central Pier, Atlantic City, N. J., in accordance with the information contained on advertising page 36 of this issue of THE JOURNAL.

WOMAN'S AUXILIARY

Pennsylvania

The Schuylkill auxiliary recently held the annual Health Institute in Pottsville. This was the sixth institute given by the Schuylkill auxiliary. Dr. Stanley P. Reimann, Philadelphia, pioneer in the field of cancer, was the principal speaker. Dr. Reimann also answered questions from the audience, after which a motion picture, "Choose to Live," was given. A film on tuberculosis was explained by Dr. Wilton R. Glenney, Pottsville, and a third picture on syphilis entitled "With These Weapons" was shown. The institute was opened by Mrs. Charles V. Hogan, president of the auxiliary. Mrs. J. William Jones was chairman of the institute, which was conducted in cooperation with the Women's Field Army.

The Lycoming auxiliary met recently in Williamsport. A letter from England citing the need for surgical instruments was read, and Mrs. J. Stanley Smith and Mrs. Carl H. Senn were appointed as a committee to attempt to procure these instruments. A letter of acknowledgment was read by Mrs. Senn, treasurer, for the sterilizer recently bought by the auxiliary for the Williamsport Hospital; also a letter of appreciation for \$250 received for the Medical Benevolence Fund. Both gifts were made possible through proceeds received from the Medical Auxiliary Ball. Five dollars was donated for the local Salvation Army youth project.

The Lycoming County auxiliary's annual ball attracted more than 1,000 members and guests, and netted \$1,300 to support the objectives of the auxiliary. Mrs. P. Harold Decker was chairman of the ticket committee. Of the \$1,300 realized from the dance, \$600 has been earmarked for the purchase of a sterilizer for the City Hospital and \$250 more for the Medical Benevolence Fund of the state medical society.

Wisconsin

Mrs. S. A. Theisen was hostess to eighteen members of the Woman's Auxiliary to the Fond du Lac County Medical Society, recently. Mrs. D. F. Gosin of Green Bay, president of the state auxiliary, was a speaker. An appropriation was voted for the Children's Home. Mrs. Claude Musolf spoke on the Girl Scout troop sponsored by the auxiliary.

At the luncheon meeting of the Woman's Auxiliary to the Medical Society of Milwaukee County, recently, fifty-four members and sixteen guests, including Dr. Timothy Howard, president of the Milwaukee County Medical Society, were in attendance. Dr. James Sargent, past president of the Wisconsin Medical Society, spoke on the "Oath of Hippocrates." Mrs. William Liefert, chairman of Volunteers for Defense Committee, asked ex-registered nurses among the doctors' wives to help teach home nursing for the Red Cross.

Medical News

(PHYSICIANS WILL CONFER A FAVOR BY SENDING FOR THIS DEPARTMENT ITEMS OF NEWS OF MORE OR LESS GENERAL INTEREST: SUCH AS RELATE TO SOCIETY ACTIVITIES, NEW HOSPITALS, EDUCATION AND PUBLIC HEALTH.)

ADDITIONAL MEDICAL COLLEGE NEWS AND ARTICLES APPEAR IN THE STUDENT SECTION, PAGE 757.

CALIFORNIA

Meeting of Study Club.—The Research Study Club of Los Angeles held its eleventh annual midwinter postgraduate clinical course in ophthalmology and otolaryngology, January 19-30. A feature this year was a special course on "Applied Anatomy and Cadaver Surgery of the Head and Neck," January 22-28, under the direction of Drs. Simon H. Jesberg, associate clinical professor of surgery, University of Southern California School of Medicine, Los Angeles, and Samuel A. Crooks, associate professor of anatomy, College of Medical Evangelists, Loma Linda. Guest speakers in the regular course on ophthalmology and otolaryngology were Drs. Ralph I. Lloyd, Brooklyn, and John R. Lindsay, Chicago.

Society News.—Dr. John H. Lawrence, San Francisco, addressed a joint meeting of the Los Angeles County Medical Association and the junior section of the Los Angeles Surgical Society, January 9, on "The Cyclotron and Its Application to the Practice of Medicine."—The Los Angeles Obstetrical and Gynecological Society was addressed, February 10, among others, by Drs. George W. Hewitt, Los Angeles, on "The Sudden Ruptured Pelvic Abscess" and George E. Judd, Los Angeles, "General Peritonitis—Recent Improvements in Treatment."—Dr. Kenneth S. Davis, Los Angeles, addressed the Los Angeles Surgical Society, February 13, on "Roentgenologic Diagnosis, Lesions of the Small Bowel."

Medical Committee to Study Industrial Problems.—The San Francisco County Medical Society has appointed a committee on industrial health which is prepared to study the individual health problems of industrial establishments in San Francisco without charge. The committee aims to cooperate with plant officials in devising means to reduce and remove needless health and accident hazards. Where special engineering procedures or prolonged medical studies are advisable, the committee will recommend competent persons to carry them out. The committee sent a letter and questionnaire to the managers of all firms in the city and county of San Francisco employing fifty or more persons in an effort to ascertain what specific problems may be their consideration. In the belief that many plants could establish industrial medical services which would pay substantial dividends in reduced compensation costs, increased efficiency and improved personnel relationship, the committee will help organize medical departments at the request of interested managements. All information exchanged between the committee and the plant is to be confidential. Members of the new committee are Drs. Rodney R. Beard, chairman, Nelson J. Howard and John Lawrence Brown, all of San Francisco.

CONNECTICUT

State Society to Supervise Merit System Examinations.—At the request of Mr. Harry W. Marsh, state personnel director, the Connecticut State Medical Society has accepted the responsibility for the organization and supervision of competitive examinations of physicians seeking public employment in the state merit system. Announcement has been made of examinations to fill appointments as crippled children physician, child hygiene physician, senior physician (psychiatric), assistant physician and supervisor of medical services (welfare).

Forum on Health in Industry.—At a recent meeting of the executive committees on industrial health of the Manufacturers' Association of Connecticut and the state medical society it was decided that future activities be devoted to preparing for a one day clinic or forum on health in industry and to developing standards for industrial medicine medical service, physical examinations and record forms. All groups interested in furthering industrial health in Connecticut will be invited to assist in arranging the program for the clinic, and steps will be taken to unify the aims of these various organizations.

DELAWARE

Special Military Program.—The New Castle County Medical Society presented a special military program for its members at the Academy of Medicine, Wilmington, February 17. The speakers included:

Lieut. Col. Arthur G. Compton, M. C., U. S. Army, Fort Du Pont, Problems Met by a Medical Officer on Duty in an Army Hospital.
Capt. Joseph R. Beck, M.C., U. S. Army, Fort Du Pont, Problems Met by a Medical Officer on Duty with Tactical Troops in the Field
First Lieut. Robert M. Edelman, M. C., U. S. Army, Fort Du Pont, Demonstration of a Rapid Method of Blood Typing of Large Groups.
Dr. William H. Speer, Wilmington, The Function of the Office for the Procurement and Assignment of Physicians for the Army and Navy.

GEORGIA

Atlanta Clinical Society Lectureship.—Lectures will be delivered at the Academy of Medicine, Atlanta, March 5-6, under the auspices of the Atlanta Clinical Society. The speakers will be Dr. John B. Youmans, associate professor of medicine, Vanderbilt University School of Medicine, Nashville, Tenn., on "The Nutrition of Populations with Particular Reference to War Time Conditions," March 5, and Comdr. Charles S. Stephenson, U. S. Navy, Washington, D. C., "Medical Military Observations in England," March 6.

ILLINOIS

Personal.—Dr. Joseph A. Campbell has resigned as managing officer of the East Moline State Hospital.—Dr. Joe H. Price has resigned as state district health superintendent at McLeansboro. Until further notice Dr. Joseph L. Bryan, Xenia, of the Flora office will take over the work in Hamilton and White counties included in this district, and Dr. Roy W. Harrell of the Carbondale office will take over the work in Williamson, Saline, Gallatin and Franklin counties.

Psychiatric Research Council.—Dr. Harry R. Hoffman, state alienist, has been appointed chairman of the Illinois Psychiatric Research Council. Other members of the council which were announced by Governor Green on January 27 include the following, all of whom are of Chicago:

Dr. Peter Bassoe, professor of neurology, University of Illinois College of Medicine.
Dr. Lewis J. Pollock, professor of nervous and mental diseases, Northwestern University Medical School
Dr. Francis J. Gerty, professor of psychiatry at Illinois
Dr. John J. Madden, associate professor of neurology and psychiatry and chairman of the department, Loyola University School of Medicine.
Dr. David Slight, professor of psychiatry, University of Chicago, the School of Medicine.
Dr. Paul L. Schroeder, professor of psychiatry and criminology at Illinois
Mr. John Nuveen Jr., chairman of the state board of welfare commissioners.

The purpose of the council is to facilitate the function and provide for the permanent maintenance of cooperative relations in teaching and research between universities and the department of public welfare of Illinois.

Chicago

The Bacon Lectures.—Dr. Jennings C. Litzenberg, professor emeritus of obstetrics and gynecology, University of Minnesota Medical School, Minneapolis, will deliver the Charles Sumner Bacon Lectures for 1941-1942 in the Medical and Dental College Laboratories Building of the University of Illinois College of Medicine, March 18-19. His subjects will be "The Significance of the Decreased Maternal Mortality Rates" and "Tradition and Truth Concerning Ectopic Pregnancies."

Elective Course in Endocrinology.—The University of Chicago has announced a special group of lectures in an elective course in endocrinology during the winter quarter. Among the instructors are Fred C. Koch, Ph.D., emeritus professor and chairman of the department of biochemistry; Carl R. Moore, Ph.D., professor and chairman of the department of zoology; George W. Bartelmez, Ph.D., professor of anatomy; Dr. Allan T. Kenyon, professor of medicine; Drs. Samuel Soskin, Franklin G. McLean, Arno B. Luckhardt, Victor Johnson and F. Joseph Mullin, Ph.D., and Howard Mauthe, Ph.D.

New Blood Donor Service.—A blood donor service center has been opened in the Blum Building, 624 South Michigan Avenue, under the auspices of the Chicago chapter of the American Red Cross. Blood donated will be processed into blood plasma at the Abbott Laboratories in North Chicago, to be available for emergency uses and by the armed forces. Dr. Sidney O. Levinson, director of the Samuel Deutsch Serum Center of Michael Reese Hospital, is the technical director. He will also be in charge of a medical advisory board, members of which include Drs. Herman Bundesen, health commissioner of Chicago; James P. Simonds, president of the Chicago Medical Society; Malcolm T. MacEachern, associate director

of the American College of Surgeons, and Joseph L. Baer of the Institute of Medicine of Chicago. The center will be open from 9 in the morning to 5 in the evening each day except Sunday. Donations from donors will be accepted by appointment only.

Memorial to Dr. Cutter.—The Council on Medical Education and Hospitals of the American Medical Association sponsored a meeting in the Assembly Hall of the Association headquarters on Monday evening February 16 to honor the memory of the late Dr. William Dick Cutter, Secretary of the Council since 1931. The meeting was held during the two day Annual Congress on Medical Education and Licensure at the Palmer House. The speakers were Dr. Ray Lyman Wilbur, Stanford University, Calif., whose address was entitled "Cutter, the Medical Administrator"; Dr. Charles Gordon Heyd, New York, "Cutter, the Medical Educator," and Alphonse M. Schwitala, S.J., St. Louis, "Cutter, the Man." Dr. Wilbur, who presided, read the letters of tribute sent from all parts of the country. The three principal papers offered as part of the memorial were inspiring testimony to Dr. Cutter's reputation as an able administrator and marked his great contribution to medical education.

Interprofessional Meeting on War Activities.—More than twelve hundred physicians, dentists and veterinarians from northern Indiana, northern Illinois and southern Wisconsin met in the Museum of Science and Industry, Chicago, Sunday afternoon February 22 at a meeting sponsored by the Chicago Medical Society for the purpose of explaining the role the three professions will play in the nation's war effort. Speakers were Dr. Charles H. Phifer, chairman of the Procurement and Assignment Committee for the Sixth Corps Area; Major Sam F. Seeley, executive director, Procurement and Assignment Service, Washington, D. C.; Col. Paul G. Armstrong, director of selective service for Illinois, and Dr. Morris Fishbein, Editor of *THE JOURNAL*. Dr. James P. Simonds, president of the Chicago Medical Society, presided. Dr. H. Prather Saunders, chairman of the medical preparedness committee of the Chicago Medical Society, had charge of arrangements. Cooperating in holding the meeting were the Chicago Dental Society and the American Veterinary Medical Association.

LOUISIANA

Dr. Kostmayer Named Acting Dean at Tulane.—Dr. Hiram W. Kostmayer, professor of clinical gynecology and director of the department of graduate medicine, Tulane University of Louisiana School of Medicine, New Orleans, has been appointed acting dean of the medical school during the absence of Dr. Maxwell E. Lapham, who has been assigned to special duty in the Bureau of Medicine and Surgery, U. S. Navy. Dr. Lapham left for Washington on February 13.

Society News.—The Orleans Parish Medical Society devoted its meeting, January 26, to a symposium on tumors of the central nervous system. The speakers were Drs. Hugh Page Newbill, Herbert Randolph Unsworth, Lewis A. Golden, Gilbert C. Anderson and Dean H. Echols. All are from New Orleans. The society was addressed recently by Sidney W. Bliss, Ph.D., on "Enrichment of White Flour with Vitamins"; Drs. John H. Musser and Robert H. Onstott, "Venereal Disease Among Selectees and Volunteers in Louisiana," and Henry D. Ogden, "Modern Concepts in the Treatment of Bronchial Asthma."

Public Health Meeting.—The eighteenth annual meeting of the Tuberculosis and Public Health Association of Louisiana was held at the Washington-Youree Hotel, Shreveport, January 27-28. Dr. Julius L. Wilson, New Orleans, gave the presidential address on "The Place of Voluntary Tuberculosis Associations in Statewide Programs." Other speakers included:

- Dr. Henry C. Sweany, Chicago, The Pathogenesis of Tuberculosis and Application of the Knowledge in the Control of the Disease.
- Dr. William J. Sandidge, Shreveport, Case Finding Through the Health Unit.
- Dr. Herbert N. Barnett, Benton, Cooperation of Health Units with Tuberculosis.
- Dr. Russell H. Frost, Monroe, Procedures After the Tuberculous Patient Is Found.
- Dr. Sydney Jacobs, New Orleans, Ambulatory Treatment of Tuberculosis.

NEW JERSEY

Society News.—Dr. William H. Perkins, Philadelphia, will address a meeting of the Fifth Council District of the Medical Society of New Jersey, March 13, at Northfield, on "Untapped Resources in Preventive Practice."—At a recent

meeting of the Cumberland County Medical Society, February 10, in Bridgeton Dr. Franklin L. Payne, Philadelphia, discussed "Significance of Abnormal Vaginal Bleeding."

Physicians Honored.—The Summit County Medical Society devoted a recent dinner meeting in Summit to honoring Dr. Thomas P. Prout, who has completed fifty years in the practice of medicine. He was presented with a plaque as a memento of the occasion. Dr. Prout is a founder of the Summit County Medical Society, which was organized in 1905, and also a founder of the Academy of Medicine of Northern New Jersey. In 1902 he established, with the late Dr. Eliot Gorton, the Fair Oaks Sanatorium. He graduated at the College of Physicians and Surgeons, medical department of Columbia College, New York, in 1891.—Dr. George W. Cummins, Belvidere, was guest of honor at a dinner in Belvidere recently given by the Warren County Medical Society to observe his completion of fifty years as a practicing physician. He was presented with honorary life membership in the society. A specially bound volume of Dr. Cummins' book on the medical history of the county was presented to the society by Mrs. Cummins.

NEW YORK

Society News.—The Yonkers Tuberculosis and Public Health Association gave a dinner on Dec. 3, 1941 to mark the twenty-fifth anniversary of its founding; the speakers included Dr. Herbert R. Edwards, director, bureau of tuberculosis, New York City Department of Health, who gave a talk on "The Essential Elements of a Tuberculosis Control Program."—Dr. Herrman L. Blumgart, Boston, discussed angina pectoris before the Medical Society of the County of Albany, January 28.

Fifty Years of Practice.—The Medical Society of the County of Erie recently held its Fall Clinical Day and Dinner to honor physicians who have practiced fifty years or more. The speakers included Drs. Jonathan C. Meakins, Montreal, Canada, from the standpoint of the general practitioner; Charles G. Heyd, New York, "The Concept of Liver Deaths," and Jennings C. Litzenberg, Minneapolis, "Fifty Years of Change in Obstetrics." Dr. Logan Clendening, Kansas City, Mo., was a speaker at the annual dinner, discussing "Reminiscences." There were forty-one guests of honor at the dinner.

Typhoid Carrier Operates Food Store.—A man who had been declared a typhoid carrier in 1937 was recently tried and convicted by a court of special sessions in a community in Westchester County for his failure to keep health officials informed of his whereabouts and to observe other control measures imposed by the state sanitary code. In 1941, after the man had failed to report to district health authorities, an investigation by health and police officials disclosed that the carrier had assumed another name, moved across the street, although friends had reported him to be out of town, and was operating a food store in the immediate neighborhood. In the recent trial he was found guilty of violating the sanitary code, fined \$50 and placed on probation for three years.

New York City

Conferences for the Practicing Physician.—The bureau of social hygiene of the city department of health is conducting a series of educational conferences for the physician in practice. The new series opened, February 14, with a conference on "Venereal Diseases for the Practitioner" and will continue on six consecutive Saturday mornings through March 21. Cases from the Central Clinic will be presented, and lectures will be illustrated by lantern slides.

New Society to Consider Psychiatric Problems in Children.—A group of psychiatrists has organized a program to deal with war time psychiatric problems in children. The group has named itself tentatively the New York Society for Child Psychiatry, with temporary headquarters at the Payne Whitney Psychiatric Clinic of New York Hospital. Members of the coordinating committee include Drs. Lauretta Bender, chairman, Juliette Louise Despert, William S. Langford and Frank J. Curran.

Clinic for Speech Disorders.—Plans were recently announced for the establishment of a clinic at the National Hospital for Speech Disorders "for the study of the brain wave patterns of stutters and sufferers from other speech and voice disorders." According to the *New York Times*, the clinic was to be made possible through grants from Child Neurology Research. Dr. James Sonnett Greene is founder and director of the hospital, which recently celebrated its twenty-fifth anniversary.

OHIO

Hospital News.—The Massillon City Hospital, Massillon, has announced plans to construct a \$150,000 addition which will increase its capacity to one hundred and fifty beds. The Office of Dr. William Henry Walsh, Chicago, has been named consultant to prepare plans for the addition.

Society News.—The Montgomery County Medical Society was addressed, February 6, by Dr. Frederick A. Coller, Ann Arbor, Mich., on "Our Water Balance."—The annual meeting of the Cleveland Medical Library Association was addressed, January 6, by Everett Rhodes Castle, humorist and short story writer of Cleveland, on "The Patient Will See You Now, Doctor."

Changes in Health Officers.—Dr. George W. Bassow, Steubenville, has resigned as health commissioner of Jefferson County to return to private practice in Massachusetts.—Dr. Frank Ternocky Jr., Bloomville, has been elected health commissioner of Seneca County.—Dr. Beatrice A. T. Hagen, Zanesville, who has been health commissioner of Muskingum County for twelve years, has been reappointed for a one year term; she is also secretary of the Muskingum County Academy of Medicine.—Dr. Alexander S. Mack, Oak Harbor, has been reappointed health commissioner of Ottawa County.—Dr. Forder F. DeMuth, Hicksville, has been appointed health commissioner of Defiance County, succeeding Dr. Henry C. Linder-smith, Sherwood, resigned.

TENNESSEE

The Flexner Lectures.—The Abraham Flexner Lectures were given at the Vanderbilt University School of Medicine, Nashville, by Drs. Donald D. Van Slyke of the Rockefeller Institute for Medical Research, New York, and Warfield T. Longcope, professor of medicine, Johns Hopkins University School of Medicine, Baltimore. Dr. Van Slyke discussed "Physiology of the Kidney," February 2, and "Renal Function in Diseases of the Kidney," February 3. Dr. Longcope considered "Clinical Nephritis" in both his lectures, February 5 and 6.

Physical Education Program for Public Schools.—The state department of education has set up a five year program for physical education in public schools. It is planned to divide the state into twenty areas, and meetings of school teachers, principals and superintendents will be held to discuss the program. According to an announcement it is proposed to cooperate with all other agencies within the state that have child welfare as an objective to bring about a necessary coordination and correlation of an effective state program. It is also planned to cooperate with the state department of health by adding stimulus to a project of health examination in the public schools of the state which will eventually provide for medical examinations of all pupils in public schools. In a follow-up program, parents will be notified of defects found and urged to refer the child to the family physician for their correction. A well planned program in nutrition, communicable diseases and health instruction is considered in the comprehensive five year project, in which the cooperation of county medical societies, civic and local groups will be enlisted.

TEXAS

Spring Clinical Conference.—The Dallas Southern Clinical Society will hold its fourteenth annual Spring Clinical Conference, March 23-26, at the Hotel Adolphus in Dallas. Guest speakers, each of whom will give more than one paper, will include:

- Dr. Tinsley R. Harrison, Winston Salem, N. C., The Value and Limitation of Drugs in Treatment of Cardiac Disease.
- Dr. Lewis M. Hurethall, Boston, Gastrointestinal Symptoms in Patients with Heart Disease.
- Dr. Edward G. Billings, Denver, Differentiation of Psychogenic and Organic Gastrointestinal Disorders.
- Dr. Alan R. Moritz, Boston, Head Injuries.
- Dr. Chester A. Stewart, New Orleans, The Control of Tuberculosis in Private Practice.
- Dr. Andrew C. Ivy, Chicago, The Applied Physiology of the Biliary Tract with Therapeutic Considerations.
- Dr. George T. Pack, New York, Treatment of Benign and Malignant Tumors of the Skin.
- Dr. Barney Brooks, Nashville, Tenn., Operative Treatment for Benign Ulcerations of the Stomach and Duodenum.
- Dr. Henricus J. Stander, New York, The Management of Abnormal Vaginal Bleeding.
- Dr. Vincent J. O'Connor, Chicago, Urologic Aspect of Low Back Pain.
- Dr. Grady E. Clay, Atlanta, Ga., Treatment of Convergent Squint.
- Dr. Francis L. Lederer, Chicago, Evaluation of Early Oticogenic Complications.

VIRGINIA

Personal.—Dr. Peter A. N. Pastore, Rochester, Minn., has been appointed professor of otolaryngology and rhinology at the Medical College of Virginia, Richmond, where he graduated in 1934.—Dr. and Mrs. James H. Ferguson, Clifton, recently observed their fiftieth wedding anniversary. Dr. Ferguson has also been practicing medicine for fifty years.—Dr. Clifford E. Waller, Silver Spring, Md., medical director, U. S. Public Health Service, retired, has been named health officer in Loudoun County.—Dr. Aaron Wilson Brown, Richmond, recently resigned as full time venereal disease control officer of Richmond to locate in Pocahontas; he was the first to hold this position.

New Division for "General Practice."—The Medical College of Virginia, Richmond, has announced new rules and regulations for the use of private beds in its teaching hospitals. It has been decided to establish a special category for general practice, the latter to cover general medicine, normal obstetrics and lesser surgery. The change is in addition to the present custom of limiting the practice of any accredited member of the staff to one of the major clinical divisions of pediatrics, obstetrics and gynecology, psychiatry and neurology, internal medicine, general surgery and gynecology, and in addition to the usual specialties of medicine and surgery. According to Dr. Lee E. Sutton Jr., dean of the school of medicine, the privilege of practice with private patients in the teaching hospitals is limited to those now on the faculty or to those who have given service under certain conditions in the past.

PUERTO RICO

Congress for the Blind.—The first Pan American Congress of the Blind will be held in Santurce sometime in 1942, the exact date to be announced later. The congress has been organized under the auspices of the Association for the Blind of Puerto Rico. Dr. Jose Pana Reyes is the president of the organizing committee, Apartado 3656, Santurce.

GENERAL

Society News.—The Association of Military Surgeons will hold its 1942 annual session in San Antonio, November 5-7, with headquarters at the Hotel Gunter.—Recently elected officers of the Mississippi Valley Conference on Tuberculosis include Will Ross, Milwaukee, president; Dr. John H. Skavlem, Cincinnati, vice president, and A. W. Jones, St. Louis, secretary-treasurer.

Special Society Election.—Dr. Marius N. Smith-Petersen, Boston, was chosen president-elect of the American Academy of Orthopaedic Surgeons, and Dr. Carl E. Badgley, Ann Arbor, Mich., was installed as president. Other officers are Drs. Robert V. Funsten, Charlottesville, Va., vice president; Philip Lewin, Chicago, librarian; Eugene B. Mumford, Indianapolis, treasurer, and Rex Diveley, Kansas City, Mo., secretary. The next meeting will be in Chicago, Jan. 17-21, 1943.

National Noise Abatement Week.—The National Noise Abatement Council has designated May 31-June 6 as National Noise Abatement Week. Educational efforts this year will be directed to informing the public to a realization of the importance of eliminating needless noise as a vital wartime measure. Preliminary programs are now under consideration in forty principal cities where local noise committees are already formed. Additional information may be obtained from the National Noise Abatement Council, 9 Rockefeller Plaza, New York City.

Examination in Dermatology and Syphilology.—The American Board of Dermatology and Syphilology will hold a written examination in various large cities in the country on November 16. Applications must be received by the secretary on or before October 5. An oral examination will be held in Cleveland on January 14-15, 1943, applications in group A to be received by the secretary, December 7. If sufficient applications are filed before March 23, 1942 an examination will be held at Atlantic City on June 4-5. Dr. Clarence Guy Lane, 416 Marlboro Street, Boston, is the secretary.

Mrs. Emily Cushing Dies.—Mrs. Emily Prescott Cushing, who abstracted foreign medical literature for THE JOURNAL from 1895 until 1926, died February 12 in Belleair, Fla., of cerebral hemorrhage. Mrs. Cushing was born in Tallahassee, Fla., Dec. 31, 1853. She was a member of the Chicago Woman's Club from 1910 to 1928. For a number of years she was responsible for all translations appearing in THE JOURNAL. Mrs. Cushing had facility in translating German, French, Italian, Spanish, the Scandinavian languages, Dutch, Russian, Polish, Portuguese and several local modifications of these languages. She was a prodigious and talented worker.

Conference of Radiologists.—The American College of Radiology held its twelfth annual conference meeting with teachers of clinical radiology, February 15, under the auspices of the Commission on Education at the Palmer House, Chicago. The speakers were Major Sam F. Seeley, Washington, D. C., "The Function of the Procurement and Assignment Service for Physicians, Dentists and Veterinarians"; Major Alfred A. de Lorimier, Washington, D. C., "The Character and Extent of Roentgenological Services in the Field of Combat," and Dr. Joshua C. Dickinson, Tampa, Fla., "What Obligations Do We Have to the Radiologist Who Is Called into the Service?" Dr. Byrl R. Kirklin, Rochester, Minn., led a panel discussion on "Should the Training of Residents and Fellows in Radiology be Modified During the Period of the War?"

Kalamazoo Coaches, Inc., Not Authorized to Mention Approval of Catastrophe Unit.—Dr. George Baehr, chief medical officer, Office of Civilian Defense, Washington, D. C., has written to the effect that the Kalamazoo Coaches, Inc., has not been authorized to mention in its advertising literature that the West Catastrophe Unit is approved by him or by Dr. James M. Macintosh, professor of public health, University of Glasgow and formerly chief health officer of Scotland. Dr. Baehr points out that critical comments made by Professor Macintosh could hardly be considered justification for the statement contained in the advertising literature. In one place he says the vehicle is "too costly for the purpose it serves. . . . Even apart from the expense, I think the principle is wrong. . . . An incident should be regarded as consisting of not less than twenty injured persons. It is obvious that this cramped and costly accommodation could not deal efficiently with this number; time would be wasted at every stage by lack of space and the various boxes containing instruments could not be effectively handled."

Conservation of Scientific Journals.—The Committee on Aid to Libraries in War Areas of the American Library Association has issued an appeal for the conservation of scholarly and scientific journals. The committee believes that timely attention to the fact that libraries in war areas are handicapped in completing their institutional sets of American scholarly, scientific and technical periodicals will obviate a duplication of the difficult task in library reconstruction after the first world war. Many sets of journals will be broken by the financial inability of the institutions to renew subscriptions; many more will have been broken through mail difficulties and loss of shipments; other sets will disappear through destruction of libraries. The committee also points out that, with an imminent paper shortage, attempts are being made to collect old periodicals for pulp and urges that care be shown in the contribution of material to the pulp demand. All communications should be directed to Wayne M. Hartwell, executive assistant, Committee on Aid to Libraries in War Areas, Rush Rhees Library, University of Rochester, Rochester, N. Y.

Southeastern Surgical Congress.—The thirteenth annual postgraduate assembly of the Southeastern Surgical Congress will be held at the Biltmore Hotel, Atlanta, Ga., March 9-11. Special papers to be offered this year in addition to the regular program include the following:

- Dr. Fred W. Rankin, Lexington, Ky., The Medical Profession and War Duties.
- Dr. Leonard G. Rowntree, chief of the medical division, Selective Service, Washington, D. C., How Can the Medical Profession Augment National Efficiency During Wartime?
- Dr. Sanford W. French, Atlanta, Medical and Surgical Service in the Training Camps.
- Dr. Robert H. Ivy, Philadelphia, Early and Late Treatment of the Face and Jaws as Applied to War Injuries.
- Dr. Joseph D. Collins, Portsmouth, Va., The Part the Railroad Surgeon May Play in the National Emergency.
- Dr. James S. McLester, Birmingham, Ala., War and the Nutrition of the Nation.
- Dr. Julian L. Rawls, Norfolk, Va., The Medical Profession in the South in Time of War.
- Dr. George Baehr, chief medical officer, Office of Civilian Defense, Washington, D. C., Field and Hospital Services for Civilian Casualties.

Mr. Paul V. McNutt, federal security administrator, will also address the meeting.

CANADA

Hospital News.—The Victoria General Hospital, Halifax, Nova Scotia, will construct a new three hundred bed addition. The Office of Dr. William Henry Walsh, Chicago, has been retained as hospital consultant.

Institute of Physiology.—Newspapers reported that the University of Toronto Faculty of Medicine, Toronto, has announced plans to establish an institute of physiology, to be under the direction of Dr. Charles H. Best, professor of physiology and head of the department; also that two new subdepartments have been organized in the School of Hygiene at Toronto; namely, public health administration and nutrition.

LATIN AMERICA

Hygiene Group Formed.—The Asociación Argentina de Médicos Higienistas was recently established in Buenos Aires to project activities now being carried on by centers and groups of hygiene workers and to facilitate all work of hygiene for the public. The association also aims to work for governmental recognition of a "diploma of hygiene physician." Drs. Alfredo Piquero and Juan Pérez del Chaco, Buenos Aires, were chosen president and secretary, respectively. One requirement for membership in the new association is to be approved in the postgraduate course of hygiene which is given by the Institute of Hygiene of the Faculty of Medicine of the University of Buenos Aires.

Deaths in Other Countries

Dr. Heinrich Finkelstein, formerly professor of pediatrics, University of Berlin, Germany, died January 28 at Santiago, Chile, of typhoid complicated by a heart attack. Dr. Finkelstein was born in Leipzig July 31, 1865. He enjoyed an international reputation as a distinguished teacher of pediatrics and was the author of numerous books on his specialty.

Government Services

Proposed Federal Workers Health Service

Newspapers reported on January 30 that plans are being considered to establish a federal workers' health service to reduce sick leave, which costs \$100,000,000 a year. Tentatively a unit would be formed in each department, roughly patterned after industrial preventive medicine programs, with the emphasis placed on prevention and discovery of disease. Treatment and cure would be left to the private physician. According to the newspapers, the plan calls for a medical director for each department to be selected from the staff of the U. S. Public Health Service but who would be responsible administratively to the department head. The public health service, through its division of industrial medicine, would coordinate the program. It is proposed that the medical director would perform regular physical examinations to discover disease before it resulted in a request for sick leave, conduct health education programs, discover and remove health hazards, prepare sick leave studies as a basis for improving the medical service and provide first aid and treatment for minor ailments and discomforts.

Health of the Navy

During the calendar year 1940 the general health of the navy was excellent. The principal exception was a major epidemic of influenza, which was widespread from September to December. Also, as was expected, there was a sharp increase of the childhood type of communicable diseases such as measles, mumps and German measles. This was due to the increase of new, unseasoned personnel in the expanding navy. Although these respiratory and other communicable diseases caused a 20 per cent increase in the general admission rate over that of 1939, they were of minor character, averaging only six and eight-tenths sick days per case and causing no increase of death rates. The admission rates for venereal diseases decreased 7 per cent, and for injuries 4 per cent. Seventy-one per cent of the decrease of venereal diseases was due to reduction of syphilis. The general death rate decreased 8 per cent. There were 99,886 new admissions for all causes, giving a rate of 492.99 per thousand as compared with 408.37 in 1939 and 453.16 the previous nine year median. There were 9,643 new admissions for injuries, giving a rate of 47.59 per thousand as compared with 49.38 in 1939 and 60.04 the previous nine year median. There were 392 deaths from all causes, giving a rate of 1.93 per thousand as compared with 2.10 in 1939 and 2.85 the previous nine year median. Motor vehicle accidents caused 85 deaths. There were 32 deaths from drowning. There were 2,907 persons invalidated from the service, giving a rate of 14.35 per thousand as compared with 10.37 in 1939 and 12.18 the previous nine year median. The total number of sick days was 1,804,116, giving an average of 8.90 per person and 18.96 per admission. A catastrophe occurred on June 20, 1941, when the submarine U. S. S. O-9 sank off the Isle of Shoals (Portsmouth, N. H.) while on a trial run. Two officers and thirty-one enlisted men were lost. None were rescued. There were no disasters of major importance during the calendar year 1940.

Foreign Letters

LONDON

(From Our Regular Correspondent)

Jan. 10, 1942.

British Medical Aid to Russia

Mrs. Churchill's Red Cross fund, which in less than two months has raised nearly \$5,000,000 for medical help to Russia, is financing the greatest exports of medical and surgical supplies that have ever been sent from this country. Already five large consignments have been sent to Russia, and packages are being dispatched in every ship in which space can be found. The value of the supplies already sent is approximately \$1,000,000. The Russian requests are on so vast a scale that it has been possible to supply only a fraction of them. If all the drugs and instruments wanted had been procurable in this country they would have been sent at once. The latest requirements, on which work is proceeding, include twenty-six different drugs in huge quantities and fifty-nine various surgical instruments or requisites in almost astronomical numbers. For example 750,000 ampules of strophanthin and more than 1,600,000 pounds of other drugs are requested. The surgical instruments needed exceed 13,500,000. Britain has been scoured for the articles required, and the Red Cross has bought all it could lay hands on. Large orders are being placed daily and purchases made by the Ministry of Supply through a committee of which the president of the Royal College of Physicians, Sir Charles Wilson, is chairman. He recently visited Russia.

Royal College of Surgeons to Form New Pathologic War Collection

The destruction by German bombs of much of the contents of the great pathologic and anatomic museum formed by the Royal College of Surgeons has been reported in previous letters. The invaluable collection, formed after the last great war, containing plaster casts of every type of wound, was destroyed. Arrangements have been made for the formation of another collection. The Medical Research Council has accepted a request from the War Office and the Royal College of Surgeons that it should assist in the forming of a comprehensive national collection. A special subcommittee of the War Wounds Committee has been appointed for the purpose. This subcommittee includes nominees of the three fighting services, of the Ministry of Health and of the Royal Colleges of Physicians and of Surgeons of London, as well as of the Department of Health for Scotland. It is hoped to secure the cooperation of the whole medical profession in the collection of suitable material. It is proposed that the collection shall include specimens, pictures, photographs and roentgenograms which illustrate the lesions produced by missiles, war gas or explosion gas, secondary missiles, such as fragments of masonry or debris, crushing injuries, the effect of the impact of the blast wave in air or water produced by high explosive detonation, and burns resulting from any of these causes. Material illustrating the mode of repair, the consequences of infection and the results of treatment of war wounds and injuries will be included. Specimens are to be sent in the first place to one of two receiving depots, where they will be classified and temporarily stored.

As the value of any pathologic specimen depends largely on selection, the care taken in collection and the preliminary treatment, general instructions have been given regarding preliminary treatment: 1. Only specimens should be chosen in which the lesions can be clearly displayed. 2. Every care should be taken to maintain the shape and form of the specimen during fixation, when the greatest amount of shrinkage and distortion is liable to occur. A hollow viscus should be packed with absorbent

cotton soaked in formaldehyde-saline solution before immersion in the fixative. Structures such as nerves, arteries or slices of solid organs should be fixed on a frame to prevent shrinkage or distortion.

Science and the State

In his presidential address at the two hundred and seventy-ninth anniversary of the Royal Society, Sir Henry Dale, physiologist, dealt with the increased preoccupation of science with the means of waging war and the relations between science and the state. With Russia locked in a struggle for existence and America directing its tremendous scientific and technical potential to the support of the same cause, the diversion of science from its normal objectives had spread round the world. Freedom rather than organization provided the conditions for the highest type of research. Between the two great wars the Royal Society had been given important funds for the support of researches over a wide field, in complete independence of any state control. On the other hand, the remarkable development in this country since 1914 of the state support of research, administered by three advisory councils, had taken place without any obvious detriment to the freedom of science. The Royal Society's function of advising the government had been shared and greatly diminished.

While the existing mechanisms for the support of science by the state were doubtless susceptible of improvement, he found no reason to fear any threat to the freedom of science. But in one direction he had apprehension. If science should become entangled in controversial politics, its freedom might be endangered. If science was allowed to be used as a weapon of political pressure, it could not be protected from the pressure of sectional politics. There would then be danger that fundamental researches having no immediate practical appeal would be neglected or that the rigid standards of true science would be relaxed for propaganda.

Treatment of Malaria in Soldiers

The War Office has issued a pamphlet on the treatment of malaria in soldiers returning from service in malarious areas. The possibility of malaria should be remembered in cases of pyrexia without adequate cause, especially if associated with shivering, vomiting and subsequent sweating, where there has been recent service in a malarious area. Lack of facilities for making an exact diagnosis by microscopic examination of the blood should never cause delay in treatment.

The drugs recommended fall into two groups: (1) antisymptomatic and antipyretic for the acute attack and (2) anti-infective and antirelapse after the acute attack. The antisymptomatic are quinine and mepacrine hydrochloride, the British equivalent of atabrine (German), (atabrine dihydrochloride N. N. R.) and quinacrine (French). The anti-infective drug recommended is pamaquin, the British equivalent of plasmoquine (German). Mepacrine and pamaquin should never be administered concurrently.

The standard army treatment of malaria is as follows:

Days 1 and 2. Quinine bisulfate or hydrochloride, 10 grains (0.65 Gm.) in solution in 1 fluidounce (30 cc.) of water, by mouth thrice in twenty-four hours.

Days 3, 4, 5, 6 and 7. Mepacrine hydrochloride, 0.1 Gm. tablet thrice daily, swallowed whole with a draft of water, after food.

Days 8 and 9. No antimalarial treatment.

Days 10, 11, 12, 13 and 14. Pamaquin, 0.01 Gm. tablet thrice daily after food.

Severe cerebral symptoms may occur, especially in malignant tertian malaria. They require prompt and energetic treatment by intramuscular or intravenous quinine injections. Collapse, possibly with dysenteric symptoms, requires the same treatment. Intravenous quinine should be reserved for cases of great urgency or heavy malignant infection and should never be used as a routine.

Pharmacologic Research

Before the war we depended on Germany for a large number of synthetic drugs. Arrangements have been made for their manufacture in this country to take the place of the German supply, now completely cut off. What appears to be another consequence of the war is stimulation of pharmacologic research. The latest manifestation is the founding by leading drug manufacturers of the Therapeutic Research Corporation of Great Britain, a private limited liability company with an authorized capital of \$2,500,000. Its objects are: 1. To coordinate and extend research with a view to accelerating the discovery of new substances for the service of therapeutics and prophylaxis, to ensure collaboration with medical, dental and veterinary practitioners in the introduction of new medicinal substances and to assist in the advancement of medicine by subsidization of research on a broader and more rational basis than has been so far possible in British pharmaceutical industry. 2. To provide for pooling of manufacturing facilities where desirable. 3. To enable industry to cooperate more effectively in national planning by presenting to the government through its appropriate medical, dental, veterinary, scientific and technical organizations the pooled knowledge and facilities acquired in therapeutic research.

The constituent founder companies of the corporation are Boots Drug Company, the British Drug Houses, Glaxo Laboratories, May & Baker and the Wellcome Foundation. Plans for research will be drawn up by a research panel consisting of the heads of research of the constituent companies, which will cooperate or consult with other scientific workers as special problems arise. Products evolved will be sold by the companies under a common name. The corporation will assist wherever practicable in simplifying the nomenclature of new remedies. Its research staffs include many eminent scientific workers.

Honor Memory of Murdered Polish Professors

Leading British scientists and scholars, including Sir William Bragg, lately president of the Royal Society, paid tribute to the memory of the Polish professors murdered by the Germans. The ceremony took place at the Royal Institution, London. Sir David Ross, vice chancellor of the University of Oxford, who presided, said that the persecution of Polish intellectual leaders by the Germans seemed to be part of a deliberate plan to convert Poland into a vassal country of peasants. Prof. Gilbert Murray stated that the Nazis had committed horrors for which ordinary language had no name and were guilty of systematic yet insane wickedness. Prof. Antoni Jurasz, dean of the Polish Medical School formed in Edinburgh, read a long list of names of murdered scientists and addressed them as "Dear colleagues, courageous soldiers in this deadly struggle, let me assure you that your martyrdom shall not be forgotten and that your murderers shall not escape justice."

American Hospital in England

The hospital of the Harvard American Red Cross unit is nearly completed. It consists of twenty-two wooden buildings for which the material required was shipped across the Atlantic in 4 foot sections, with a year's reserve of equipment. The unit has undertaken the study and treatment of epidemic diseases, with particular relation to wartime epidemics. It has sent out mobile field units to camps and other areas where small outbreaks have occurred. The hospital is open to both soldiers and civilians. With the exception of a few British workers, the entire staff is American. There are eight physicians with Dr. J. E. Gordon as director and Dr. Paul Beeson as associate director, and laboratory technicians under Dr. Scott, a dietitian, a chef and more than sixty American graduate nurses. Some twenty-three nurses were torpedoed on the way over and six lost their lives.

BUENOS AIRES

(From Our Regular Correspondent)

Jan. 18, 1942.

Diphtheria Control in Argentina

The antidiphtheric serum which is used in Argentina is prepared by the Bacteriologic Institute of the National Department of Hygiene of Buenos Aires. The reserves of antidiphtheric serum were depleted months ago because of the impossibility of obtaining certain drugs necessary for the preparation and conservation of the serum. A supply of 250,000,000 units of the serum was borrowed from Chile. The situation was controlled shortly after.

The national congress has passed a law for obligatory antidiphtheric vaccination of all children between 9 months and 2 years of age. By this law the National Department of Hygiene must organize a special department with central and provincial branches for vaccination and revaccination of children. The governors of the provinces will be responsible for the enforcement of the law. The municipal authorities of Buenos Aires and the Council of National Education will cooperate by giving orders to have all school children vaccinated. The vaccine should be given gratis to all children. Parents must permit vaccination of their children. Toxoid as prepared by the Bacteriologic Institute of the National Department of Hygiene and some other vaccines which have been accepted by the national authorities of public health are the only vaccines officially accepted. The vaccine should be administered in only one subcutaneous injection. The immunity should be maintained by revaccination, which should be performed one year after vaccination and again at intervals of three years. All necessary precautions for preventing reactions from hyperallergy are taken. The department of vaccination will give certificates to the parents of the vaccinated children and will keep records of vaccinated and revaccinated children. There are exemptions for children who suffer from diseases which contraindicate vaccination. All cases of suspected diphtheria should be reported to the National Department of Hygiene by writing and within three days by the parents, the directors of schools and the physicians, respectively. The Department of Hygiene will organize several departments for services for resident and semiresident children and also for ambulatory children for the diagnosis of diphtheria and for vaccination. Crusades for sanitary propaganda will be established. Laws for fines and punishment of infractions will be passed. The law will go into effect in July 1942.

Brief Items

According to a report of the ministry for public health in Paraguay, a Rockefeller research group which works in Matto Grosso, Brazil, will conduct scientific investigations on yellow fever transmitting mosquitoes in the region of the Rio Paraguay.

The Uruguayan minister for public health, Prof. Juan César Mussio Fournier, attended the meeting of the Public Health Association held in Atlantic City in October.

In response to an invitation, the Argentine government has formed a committee which is to organize the participation of Argentina in the eighth Pan American Congress of the Child (Washington, 1942); Prof. Gregorio Aráoz Alfaro is chairman.

Marriages

JOHN WINSLOW HIRSHFELD, Detroit, to Miss Barbara Elizabeth Babcock in Ithaca, N. Y., in December 1941.

JAMES FRANKLIN REINHARDT, Lincoln, N. C., to Miss Jane Washburn of Shelby in December 1941.

SAMUEL GENDELMAN, Manchester, Ohio, to Miss Betty Williams of Charleston, S. C., January 8.

Deaths

Stewart Paton, Baltimore; College of Physicians and Surgeons, medical department of Columbia College, New York, 1889; member of the Medical and Chirurgical Faculty of Maryland, American Neurological Association, Association for Research in Nervous and Mental Disease and the American Psychopathological Association; formerly associate in psychiatry at the Johns Hopkins University, lecturer in neurobiology at Princeton (N. J.) University and in psychiatry at his alma mater; was consultant in mental hygiene and lecturer in psychiatry at Yale University, New Haven, Conn., from 1926 to 1928; at one time director of the laboratory of the Sheppard and Enoch Pratt Hospital; trustee of the Carnegie Institution of Washington; author of "Psychiatry," "Education in Peace and War," "Human Behavior," "Signs of Sanity and the Principles of Mental Hygiene" and "Prohibiting Minds and the Present Social and Economic Crisis"; aged 76; died, January 7, of heart disease.

Sidney Johnston Wilson ☉ Fort Worth, Texas; Medical Department of Tulane University of Louisiana, New Orleans, 1906; past president of the Tarrant County Medical Society and the North Texas District Medical Society; member of the American Academy of Dermatology and Syphilology; professor of dermatology at the Texas Christian University Medical Department from 1912 to 1917; served in various capacities on the staffs of Baptist Hospital, City and County Hospital, Children's Hospital, Methodist Hospital and All Saints Episcopal Hospital; served during the World War; aged 59; died, Dec. 23, 1941, of coronary occlusion.

John Blair Kessler, Cedar Rapids, Iowa; State University of Iowa College of Medicine, Iowa City, 1877; Bellevue Hospital Medical College, New York, 1883; member of the Iowa State Medical Society; vice chairman of the Section on Dermatology of the American Medical Association, 1914-1915; at various times instructor and professor of dermatology and since 1933 emeritus professor of dermatology and syphilology at his alma mater; was pension examiner of the United States; formerly member of the Johnson County Insane Commission; aged 91; died, January 14, of arteriosclerosis and myocarditis.

Hugh De Valin ☉ Medical Director, United States Public Health Service, retired, New Orleans; University of Pennsylvania Department of Medicine, Philadelphia, 1899; became an assistant surgeon in the United States Public Health Service Aug. 30, 1905, a passed assistant surgeon Sept. 16, 1909, surgeon, Dec. 20, 1917, senior surgeon July 1, 1930 and medical director, Sept. 5, 1931; retired in 1939; aged 69; died, February 3, in the United States Marine Hospital of pneumonia.

Francis Joseph Scanlan, Johnstown, Pa.; Hahnemann Medical College and Hospital of Philadelphia, 1929; member of the Medical Society of the State of Pennsylvania; in 1936 was appointed to the Municipal Civil Service Commission for police and served as chairman of the board until his retirement in 1940; president of the Lee Homeopathic Hospital and in charge of the pediatrics department; aged 39; died at home, Dec. 2, 1941, of coronary thrombosis.

John Francis Urie ☉ Surgeon, Lieutenant Commander, United States Navy, retired, New London, Conn.; Harvard Medical School, Boston, 1888; entered the navy in 1888 and retired Aug. 1, 1908 for incapacity resulting from an incident of service; recalled to active duty on Sept. 15, 1917 as commanding officer, U. S. Naval Hospital, U. S. Naval Station, New Orleans; retired from active duty in May 1919; aged 79; died, January 8, of coronary thrombosis.

Frank W. Kenney, Denver; University of the City of New York Medical Department, 1893; member of the Colorado State Medical Society; served during the World War; consultant, St. Luke's Hospital, Children's Hospital and the Denver General Hospital; associate, Presbyterian Hospital, St. Anthony Hospital and St. Joseph's Hospital; medical director of the Capitol Life Insurance Company; aged 81; died, Dec. 19, 1941, of carcinoma of the prostate.

Robert T. Barnett, Lewistown, Pa.; University of Pennsylvania Department of Medicine, Philadelphia, 1895; member of the Medical Society of the State of Pennsylvania; past president of the Mifflin County Medical Society, for many years a member of the board of health; formerly member of the board of education; on the staff of the Lewistown Hospital; aged 68; died, Dec. 30, 1941, of coronary thrombosis.

Walter Cox Barker, Philadelphia; Hahnemann Medical College and Hospital of Philadelphia, 1903; member of the Medical Society of the State of Pennsylvania, American Roentgen Ray Society, Radiological Society of North America, Inc., and the American College of Radiology; on the staff of the Broad Street Hospital; aged 63; died, Dec. 27, 1941, at his home in Wynnefield of cerebral thrombosis.

Charles A. Greer, Oglethorpe, Ga.; Louisville (Ky.) Medical College, 1892; member of the Medical Association of Georgia; past president of the Macon County Medical Society; secretary-treasurer of the Third District Medical Society; for many years mayor; served in the lower and upper houses of the General Assembly of Georgia; aged 68; died, Oct. 9, 1941, of coronary occlusion.

William Frederick Zierath, Sheboygan, Wis.; Northwestern University Medical School, Chicago, 1904; member of the board of trustees of the Rocky Knoll Sanatorium from August 1926 to Dec. 31, 1931 and again from Jan. 1, 1936 until his death; aged 64; died, Dec. 5, 1941, of chronic myocarditis, paralysis agitans and bronchopneumonia.

Philip Worcester Bill, Westport, Conn.; Columbia University College of Physicians and Surgeons, New York, 1901; member of the Connecticut State Medical Society; fellow of the American College of Surgeons; member of the honorary consulting staff of the Bridgeport Hospital; aged 67; died, Dec. 29, 1941, of coronary thrombosis.

Frederick Eugene McCarty, Wellsville, N. Y.; University of Buffalo School of Medicine, 1915; served during the World War; past president of the Allegany County Medical Society; aged 48; died, January 10, of cirrhosis of the liver in the Memorial Hospital of William F. and Gertrude F. Jones, where he was a member of the staff.

Carl White Jones, High Point, N. C.; Jefferson Medical College of Philadelphia, 1937, was appointed resident in obstetrics and gynecology, New York Lying-In Hospital, New York, for 1942-1943; aged 29; died, Dec. 24, 1941, in the Baptist Hospital, Winston-Salem, of pulmonary embolus complicating staphylococcal bronchial pneumonia.

Charles S. Austin ☉ Carrollton, Mo.; Missouri Medical College, St. Louis, 1887; president of the Carroll County Medical Society; formerly county and city health officer; at one time county coroner; since 1928 member of the board of curators of Central College, Fayette; aged 79; died, Dec. 18, 1941, of carcinoma of the liver.

Victor E. Potvin, Claremont, N. H.; Laval University Medical Faculty, Montreal, Que., Canada, 1909; member of the New Hampshire Medical Society; past president of the Sullivan County Medical Society; formerly bank president; on the staff of the Claremont Hospital; aged 56; died, Dec. 10, 1941, of heart disease.

Edmund Channing Stowell ☉ Marlboro, N. H.; Harvard Medical School, Boston, 1892; member of the Massachusetts Medical Society; instructor of children's diseases from 1895 to 1900 and assistant professor from 1900 to 1911 at Tufts College Medical School, Boston; aged 75; died, Dec. 20, 1941, of heart disease.

Charles Louis Mosley, Fort Scott, Kan.; Barnes Medical College, St. Louis, 1908 and 1909; member of the Kansas Medical Society; served during the World War; was health officer of Fort Scott; aged 55; on the staff of the Mercy Hospital where he died, Dec. 2, 1941, of carcinoma of the left lung.

Frank Flanneghan Davis, East Liverpool, Ohio; Homeopathic Hospital College, Cleveland, 1896; member of the Ohio State Medical Association; served during the World War; aged 66; died, Dec. 19, 1941, in the Veterans Administration Facility, Aspinwall, Pa., of hypertension and coronary sclerosis.

Louise Tayler Jones ☉ McLean, Va.; Johns Hopkins University School of Medicine, Baltimore, 1903; member of the Medical Society of the District of Columbia; fellow of the American College of Physicians; aged 71; died, Dec. 21, 1941, of carcinoma of the breast with metastases to the lung.

Francis Alexander Thompson ☉ Milwaukee; Wisconsin College of Physicians and Surgeons, Milwaukee, 1897; assistant clinical professor of medicine at the Marquette University School of Medicine; served during the World War; aged 68; died, January 7, of coronary thrombosis.

Samuel Cathcart Ketchin, Louisville, Ga.; Medical College of the State of South Carolina, Charleston, 1916; member of the Medical Association of Georgia; served during the World War; county health officer; aged 50; died, Dec. 22, 1941, of coronary occlusion.

John G. Clay, Dallas, Texas; Vanderbilt University School of Medicine, Dallas, Texas, 1882; University of Nashville (Tenn.) Medical Department, 1883; aged 83; died in November 1941 of pneumonia, enlarged prostate with urinary obstruction and uremia.

Edward Lingan Bowlus, Baltimore; University of Maryland School of Medicine, Baltimore, 1906; pathologist, Hospital for the Women of Maryland from 1925 to 1928; aged 69; died, Dec. 31, 1941, in St. Joseph's Hospital of arteriosclerosis.

Howard Spaulding Ballard, McKeesport, Pa.; University of Pennsylvania Department of Medicine, Philadelphia, 1903; formerly on the staff of the McKeesport Hospital; aged 62; died, Dec. 27, 1941, of injuries received in an automobile accident.

William Herbert Gorton MacKay, Philadelphia; University of Pennsylvania Department of Medicine, Philadelphia, 1907; member of the Medical Society of the State of Pennsylvania; served during the World War; aged 58; died, January 5.

Corles Belford Cline, Saybrook, Ill.; Eclectic Medical Institute, Cincinnati, 1897; for many years mayor of Saybrook; aged 69; died, Dec. 31, 1941, in the Mennonite Hospital, Bloomington, of endarteritis obliterans secondary to endocarditis.

John Walker Croft, Waynesboro, Pa.; Jefferson Medical College of Philadelphia, 1899; member of the Medical Society of the State of Pennsylvania; on the staff of the Waynesboro Hospital; aged 67; died, Dec. 24, 1941, of coronary occlusion.

Bodog Felix Beck, New York; Magyar Királyi Pázmány Petrus Tudományegyetem Orvosi Fakultása, Budapest, Hungary, 1894; author of "Honey and Health" and "Bee Venom Therapy"; aged 73; died, January 1, of chronic myocarditis.

Simeon E. Mentzer @ Monroeville, Ind.; Medical College of Ohio, Cincinnati, 1885; Bellevue Hospital Medical College, New York, 1894; aged 79; died, January 11, in the Lutheran Hospital, Fort Wayne, of carcinoma of the right lung.

George Lawrence Sandy, Martinsville, Ind.; Indiana University School of Medicine, Indianapolis, 1931; on the staff of the Central State Hospital, Indianapolis; aged 41; died, Dec. 18, 1941, of injuries received in an automobile accident.

Edward John Jenkins, Glen Gardner, N. J.; Jefferson Medical College of Philadelphia, 1933; resident, New Jersey Sanatorium for Tuberculous Diseases; aged 34; died, Dec. 30, 1941, of pulmonary, laryngeal and enteric tuberculosis.

James Eugene Davies, Oxford Junction, Iowa; St. Louis College of Physicians and Surgeons, 1898; member of the Iowa State Medical Society; aged 68; died, Dec. 26, 1941, in a hospital at Maquoketa of cerebral hemorrhage.

Bertie Virgil Swisher, Radcliff, Ohio; Cincinnati College of Medicine and Surgery, 1901; served as a member and president of the Vinton County District Board of Health; aged 67; died, Dec. 15, 1941, of cerebral hemorrhage.

Felix Reville Brunot @ Surgeon, United States Public Health Service, Bethesda, Md.; Tulane University of Louisiana School of Medicine, New Orleans, 1920; aged 47; died, January 4, of a self-inflicted bullet wound.

Daniel Beckel Conklin @ Dayton, Ohio; Columbia University College of Physicians and Surgeons, New York, 1902; past president of the city board of health; aged 64; died, Dec. 13, 1941, of cerebral hemorrhage.

Herman Clyde Hughes, Du Bois, Pa.; Jefferson Medical College of Philadelphia, 1912; member of the staffs of the Maple Avenue and Du Bois hospitals; aged 62; died, Dec. 26, 1941, of cardiovascular renal disease.

Herbert John Schmoyer @ Bethlehem, Pa.; University of Pennsylvania Department of Medicine, Philadelphia, 1905; on the staff of St. Luke's Hospital; aged 64; died, Dec. 15, 1941, of coronary occlusion.

Joseph Andrew Chapman, Bakersfield, Calif.; University of Texas School of Medicine, Galveston, 1924; member of the California Medical Association; aged 43; died, Nov. 15, 1941, of cirrhosis of the liver.

James William Salisbury, Toledo, Ohio; Eclectic Medical Institute, Cincinnati, 1897; aged 70; died, Dec. 17, 1941, in the Veterans Administration Facility, Dearborn, Mich., of congestive heart disease.

Robert B. Longmire, Hale Center, Texas; Medical Department of Tulane University of Louisiana, New Orleans, 1882; aged 80; died, Dec. 19, 1941, in a hospital at Plainview of cerebral hemorrhage.

Manley Forsythe, Fremont, Iowa; Keokuk Medical College, College of Physicians and Surgeons, 1908; member of the Iowa State Medical Society; aged 62; died, Dec. 16, 1941, of cerebral hemorrhage.

Christopher C. Howard, Topeka, Kan.; Medico-Chirurgical College of Kansas City, Mo., 1905; formerly a minister; aged 82; died, January 2, of angina pectoris, chronic myocarditis and arteriosclerosis.

William A. Shobe, Ligonier, Ind.; Detroit Medical College, 1880; member of the Indiana State Medical Association; aged 85; died, Dec. 18, 1941, of carcinoma of the liver with metastases.

Oscar Johnson, Pike Road, Ala.; Medical College of Alabama, Mobile, 1896; member of the Medical Association of the State of Alabama; aged 75; died, Dec. 17, 1941, of senility.

George Curtis Lyon @ Longview, Texas; Atlanta (Ga.) School of Medicine, 1906; aged 63; died, Dec. 16, 1941, in the Tri-State Hospital, Shreveport, La., of coronary thrombosis.

Henry W. Heuser, Louisville, Ky.; Hospital College of Medicine, Louisville, 1900; aged 76; died, January 10, in St. Anthony's Hospital of a skull fracture received in a fall.

Winthrop Clinton Lincoln, Providence, R. I.; Boston University School of Medicine, 1909; served during the World War; aged 75; died, Dec. 16, 1941, of coronary occlusion.

Clara L. Kembel Cronk, Bloomfield, Iowa; Keokuk Medical College, 1892; member of the Iowa State Medical Society; aged 78; died, Dec. 19, 1941, of coronary thrombosis.

Julius John Jude, St. Louis; Missouri Medical College, St. Louis, 1898; aged 65; died, January 11, in the Lutheran Hospital of pyloric obstruction due to gastric ulcer.

Colin G. Robertson @ Sandusky, Mich.; McGill University Faculty of Medicine, Montreal, Que., Canada, 1901; aged 66; died, Dec. 19, 1941, of coronary thrombosis.

Reginald Franklin Grant, San Francisco; College of Physicians and Surgeons, Los Angeles, 1921; aged 57; died, Dec. 26, 1941, of cardiac decompensation.

Hugh M. McCullough, Louisville, Ky.; University of Louisville Medical Department, 1878; formerly county coroner; aged 83; died, January 8, of myocarditis.

James Gilmer Stone @ Bloomfield, Iowa; Hahnemann Medical College and Hospital, Chicago, 1908; aged 58; died, Dec. 15, 1941, of cerebral hemorrhage.

Wesley Franklin Stoneburner, Akron, Ohio; Starling Medical College, Columbus, 1898; aged 63; died, Dec. 14, 1941, in Los Angeles of bronchopneumonia.

Harry John Krudop, Mobile, Ala.; Medical College of Alabama, Mobile, 1904; aged 70; died, Dec. 17, 1941, of myocarditis and cirrhosis of the liver.

Rodolfo Z. Pereyra, El Paso, Texas; Escuela Médico Militar, México, D. F., 1919; aged 49; died, Dec. 9, 1941, in Cuernavaca, Mexico, of myelitis.

Mark Harpel Cornish, Sharon Hill, Pa.; Hahnemann Medical College and Hospital of Philadelphia, 1894; aged 73; died, Dec. 18, 1941, of uremia.

Frederick Archimedes Korell, Columbus, Ohio; Starling Medical College, Columbus, 1892; aged 80; died, Dec. 19, 1941, of a self-inflicted bullet wound.

Isaac Newton Simpers, Gaithersburg, Md.; Baltimore Medical College, 1891; aged 73; died, Dec. 28, 1941, of heart disease and nephritis.

J. Barrett Kleckner, Lynchburg, Ohio; American Medical College, St. Louis, 1883; aged 89; died, Dec. 19, 1941, of cerebral hemorrhage.

Thomas Benton Miller, Butler, N. J.; Jefferson Medical College of Philadelphia, 1910; aged 67; died, Dec. 17, 1941, of cerebral thrombosis.

Rollin Stephen Gregory, Portland, Ore.; Denver Homeopathic College, 1899; aged 77; died in November 1941 of carcinoma of the foot.

Marion Grant Wyatt, Bartlesville, Okla.; Missouri Medical College, St. Louis, 1884; aged 77; died, Dec. 29, 1941, of pneumonia.

Joseph Bedford Hix @ Altus, Okla.; University of Nashville (Tenn.) Medical Department, 1909; aged 63; died, Dec. 13, 1941.

Arthur Thomas Hudson, St. Petersburg, Fla.; Barnes Medical College, St. Louis, 1898; aged 69; died, January 2.

George Jacob Weitz, Cleveland; Medical College of Indiana, Indianapolis, 1898; aged 65; died, Dec. 12, 1941.

Council on Medical Education and Hospitals

ACCELERATION OF MEDICAL COURSE

Resolution Adopted by the Council on Medical Education and Hospitals of the American Medical Association Meeting at the Palmer House in Chicago, Feb. 15, 1942

The Council is of the opinion that the adoption of a program for an accelerated curriculum for approved medical schools during this war period is a decision which should be determined by each medical school.

The decision of a medical school to initiate an accelerated curriculum should be made only after a comprehensive survey of the personnel, facilities and equipment of the school and its ability to give a medical education without deterioration of the quality of the medical instruction and in conformity with the statutes of the various states and the rulings of the state medical boards.

The Council stands ready to make necessary inspections whenever in its judgment such inspections are required to maintain the present high standards of medical education.

The Council believes that financial assistance for needy medical students during the accelerated program is best provided through scholarships or loans.

UNIVERSITY OF GEORGIA SCHOOL OF MEDICINE DROPPED FROM APPROVED LIST

At its business meeting in Chicago on February 15 the Council on Medical Education and Hospitals of the American Medical Association voted as follows:

Resolved, That the University of Georgia School of Medicine be dropped from the approved list of medical schools of the Council on Medical Education and Hospitals without prejudice to the students enrolled as of Sept. 1, 1942.

Medical Examinations and Licensure

COMING EXAMINATIONS AND MEETINGS

NATIONAL BOARD OF MEDICAL EXAMINERS EXAMINING BOARDS IN SPECIALTIES

Examinations of the National Board of Medical Examiners and Examining Boards in Specialties were published in *THE JOURNAL*, February 21, page 665.

BOARDS OF MEDICAL EXAMINERS

ALABAMA: Montgomery, June 16-18. Acting Sec., Dr. B. F. Austin, 519 Dexter Ave., Montgomery.

ARIZONA: * Phoenix, April 7-8. Sec., Dr. J. H. Patterson, 826 Security Bldg., Phoenix.

ARKANSAS: * Medical. Little Rock, June 4-5. Sec., Dr. D. L. Owens, Harrison. *Eclectic*. Little Rock, June 4-5. Sec., Dr. Clarence H. Young, 1415 Main St., Little Rock.

CALIFORNIA: *Written*. Los Angeles, March 2-5. *Oral examination* (required when reciprocity application is based on a state certificate or license issued ten or more years before filing application in California), San Francisco, March 18. Sec., Dr. Charles B. Pinkham, 1020 N St., Sacramento.

COLORADO: * *Endorsement*. Denver, April 7. *Examination*. Denver, April 8-10. Application must be on file not later than March 21. Sec., Dr. George R. Buck, 831 Republic Bldg., Denver.

CONNECTICUT: * Medical. *Examination*. Hartford, March 10-11. *Endorsement*. Hartford, March 24. Sec. to the Board, Dr. Creighton Barker, 258 Church St., New Haven. *Homeopathic*. Derby, March 10-11. Sec., Dr. Joseph H. Evans, 1488 Chapel St., New Haven.

DELAWARE: Dover, July 14-16. Sec., Medical Council of Delaware, Dr. Joseph S. McDaniel, 229 S. State St., Dover.

FLORIDA: * Jacksonville, June 22-23. Sec., Dr. William M. Rowlett, Box 786, Tampa.

GEORGIA: Atlanta, June. Sec., State Examining Boards, Mr. R. C. Coleman, 111 State Capitol, Atlanta.

ILLINOIS: Chicago, April 7-9. Superintendent of Registration, Mr. Philip M. Harman, Department of Registration and Education, Springfield.

INDIANA: Indianapolis, June 16-18. Sec., Board of Registration and Examination, Dr. J. W. Bowers, 301 State House, Indianapolis.

KANSAS: Kansas City, June 2-3. Sec., Board of Medical Registration and Examination, Dr. J. F. Hassig, 905 N. Seventh St., Kansas City.

KENTUCKY: Louisville, May 27-29. Sec., State Board of Health, Dr. A. T. McCormack, 620 S. Third St., Louisville.

MAINE: Portland, March 10-11. Sec., Board of Registration of Medicine, Dr. Adam P. Leighton, 192 State St., Portland.

MARYLAND: Medical. Baltimore, June 9-12. Sec., Dr. John T. O'Mara, 1215 Cathedral St., Baltimore. *Homeopathic*. Baltimore, June 16-17. Sec., Dr. John A. Evans, 612 W. 40th St., Baltimore.

MASSACHUSETTS: Boston, March 10-13. Sec., Board of Registration in Medicine, Dr. Stephen Rushmore, 413-F State House, Boston.

MICHIGAN: * Ann Arbor and Detroit, June 10-12. Sec., Board of Registration in Medicine, Dr. J. Earl McIntyre, 202-4 Hollister Bldg., Lansing.

MINNESOTA: * Minneapolis, April 21-23. Sec., Dr. Julian F. Du Bois, 230 Lowry Medical Arts Bldg., St. Paul.

MISSISSIPPI: Jackson, June. Assistant Sec., State Board of Health, Dr. R. N. Whitfield, Jackson.

MONTANA: Helena, April 7-8. Sec., Dr. Otto G. Klein, First National Bank Bldg., Helena.

NEW HAMPSHIRE: Concord, March 12-13. Sec., Dr. T. P. Burroughs, Board of Registration in Medicine, State House, Concord.

NEW JERSEY: Trenton, June 16-17. Sec., Dr. Earl S. Hallinger, 28 W. State St., Trenton.

NEW MEXICO: * Santa Fe, April 13-14. Sec., Dr. Le Grand Ward, 135 Sena Plaza, Santa Fe.

NORTH CAROLINA: Raleigh, June 15. Sec., Dr. W. D. James, Hamlet.

NORTH DAKOTA: Grand Forks, July 7-10. Sec., Dr. G. M. Williamson, 4½ S. Third St., Grand Forks.

OHIO: *Endorsement*. April 7. *Written*. Columbus, June. Sec., Dr. H. M. Platter, 21 W. Broad St., Columbus.

OKLAHOMA: * Oklahoma City, June 10-11. Sec., Dr. James D. Osborn, Jr., Frederick.

OREGON: * Portland, April 7. Exec. Sec., Miss Lorianne M. Conlee, 608 Failing Bldg., Portland.

PENNSYLVANIA: Philadelphia and Pittsburgh, July. Act. Sec., Bureau of Professional Licensing, Mrs. Marguerite G. Steiner, 358 Education Bldg., Harrisburg.

RHODE ISLAND: * Providence, April 2-3. Chief, Division of Examiners, Mr. Thomas B. Casey, 366 State Office Bldg., Providence.

TEXAS: Galveston, March 23-25. Sec., Dr. T. J. Crowe, 918-20 Texas Bank Bldg., Dallas.

UTAH: Salt Lake City, June 29-30. Assistant Dir., Department of Registration, Mr. G. V. Billings, 324 State Capitol Bldg., Salt Lake City.

VIRGINIA: Richmond, June 17-20. Sec., Dr. J. W. Preston, 30½ Franklin Rd., Roanoke.

WEST VIRGINIA: Charleston, March 2-4. Commissioner, Public Health Council, Dr. C. F. McClintic, State Capitol, Charleston.

WISCONSIN: * Milwaukee, June 30-July 3. Sec., Dr. H. W. Shutter, 425 E. Wisconsin Ave., Milwaukee.

* Basic Science Certificate required.

BOARDS OF EXAMINERS IN THE BASIC SCIENCES

ARIZONA: Tucson, March 17. Sec., Mr. Franklin E. Roach, Science Hall, University of Arizona, Tucson.

COLORADO: Denver, March 10-11. Sec., Dr. Esther B. Starks, 1459 Ogden St., Denver.

DISTRICT OF COLUMBIA: Washington, April 20-21. Sec., Commission on Licensure, Dr. George C. Ruhland, 6150 E. Municipal Bldg., Washington.

FLORIDA: Gainesville, June 8. Sec., Professor J. F. Conn, John B. Stetson University, De Land.

IOWA: Des Moines, April 14. Dir., Division of Licensure and Registration, Mr. H. W. Grefe, Capitol Bldg., Des Moines.

MINNESOTA: Minneapolis, April 7-8. Sec., Dr. J. C. McKinley, 126 Millard Hall, University of Minnesota, Minneapolis.

NEBRASKA: Omaha, May 5-6. Dir., Bureau of Examining Boards, Mrs. Jeannette Crawford, 1009 State Capitol Bldg., Lincoln.

OKLAHOMA: Oklahoma City, May 15. Sec., Dr. Oscar C. Newman, Shattuck.

OREGON: Corvallis, July 11. Sec., Mr. Charles D. Byrne, University of Oregon, Eugene.

SOUTH DAKOTA: Vermillion, June 5-6. Sec., Dr. G. M. Evans, Yankton.

WISCONSIN: Madison, April 11. Sec., Prof. Robert N. Bauer, 152 W. Wisconsin Ave., Milwaukee.

Oregon December Report

The Oregon State Board of Medical Examiners reports 4 physicians licensed to practice medicine by reciprocity from Oct. 16 through Dec. 9, 1941. The following schools were represented:

School	LICENSED BY RECIPROCITY	Year Grad.	Reciprocity with
Northwestern University Medical School	(1937)		Utah
University of Alberta Faculty of Medicine	(1940)		Canada
University of Toronto Faculty of Medicine	(1936)		Canada
Osteopath			Kansas

* Licensed to practice surgery.

Bureau of Legal Medicine and Legislation

MEDICOLEGAL ABSTRACTS

Malpractice: Alleged Negligence in Treatment of Infection of Foot Following Piercing of Sole by Nail.—

On May 26, 1934, when Angelina Sales, a woman aged 26, was seven months pregnant, a nail in her shoe pierced the sole of her foot. She bathed the foot in a warm water and lysol solution. The injury did not bother her during the next few days and on May 30 she even took a long walk. The next day she felt a pain "which seemed to shoot upward" from her foot and noticed a pimple on the top of her foot directly over the place that the nail had pierced the sole. She burned the point of a needle with a match, pricked the pimple and soaked the foot in a lysol solution. Later in the day the pain became more severe and the defendant physician was called, arriving about 9 o'clock in the evening. He noted a "dark red, hot area . . . about the size of a 50 cent piece," and the presence of some pus and swelling in the foot. He failed to take her temperature but advised soaking the foot in warm water and epsom salt for twenty minutes every two hours. According to the physician, there was no localized abscess at that time. The treatment advised by the physician was followed, but the pain grew worse and the redness became darker, spreading from the ankle higher up the leg. Two telephone calls were made to the defendant during the early morning hours of June 1 and he advised continuance of the treatment he had prescribed. He visited the patient at 6 a. m., at which time the foot was more discolored and the red area extended up the leg. He "prescribed a wash solution and opiates" and again at 8 o'clock, apparently by phone, recommended that the same treatments be followed. At 10:30 he returned with Dr. Caglieri, who observed that the foot was badly swollen and discolored and suggested that it be placed in a high position, but he saw no necessity for an incision. Although the defendant indicated an intention to hospitalize the patient immediately and ordered an ambulance, it was 2 p. m. before she was taken to a hospital. In the meantime, about 1:30, in the absence of medical attention, the patient delivered, the child dying shortly thereafter. When the patient was received at the hospital, she was in great pain, her foot was discolored and badly swollen and the redness ran high up her leg. Hospital physicians found "infection, early gangrene and chain streptococci." According to these physicians "there was no evidence of an abscess or localization of pus but . . . the infection was general and hence there was no need for an incision." According to one of these physicians, the patient at that time had cellulitis of the foot. The following day, June 2, "a guillotine amputation" of the leg was performed.

Subsequently the patient and her husband brought suit for malpractice against the physician, basing their claim of malpractice apparently on the failure of the defendant to drain the point of infection. Several medical witnesses called by the defendant testified that there was no localized abscess of any kind, that the infection was general, that there would be no reason to make an incision and that the customary treatment was wet heat, such as the defendant had prescribed. A pathologist, who made a laboratory examination of the amputated foot, testified that he found no evidence of an abscess in the foot at that time and that if there had been an abscess in the foot on the defendant's first call some evidence of it must have persisted to the time of amputation. Apparently only one medical witness testified on behalf of the plaintiffs. This physician, in answer to a hypothetical question, stated that when the defendant first called on the patient there was an abscess present in the foot and that in the exercise of that degree of care and skill ordinarily possessed and exercised by physicians and surgeons in San Francisco (the city in which the plaintiff lived and in which the defendant physician practiced) "the only method of choice (was) the prompt opening of the primary point of infection, draining the point of infection under antiseptic

methods, and by local anesthesia." He further gave it as his opinion that the infection was afterward generalized, spreading up the leg through the system, that this resulted in the loss of the baby and the necessity for the amputation, and that these would not have occurred if the abscess had been promptly opened and drained. There was a judgment in favor of the plaintiffs and the defendant physician appealed to the district court of appeal, first district, division 2, California.

Apparently the only medical witness testifying on behalf of the plaintiffs practiced in Oakland and had never practiced in San Francisco. The defendant accordingly contended that that physician was not qualified to testify as to the method customarily used to treat such an infection in San Francisco. In view of the close proximity of the two cities, said the appellate court, and the metropolitan character of the entire area, under the circumstances this witness was sufficiently qualified to testify. This witness's testimony created a conflict in the evidence and is sufficient to support the verdict of the jury. The testimony of a medical witness in answer to a hypothetical question based on the facts in the record is sufficient to support a finding contrary to the testimony of all other medical witnesses who have seen and examined the patient. Nor can the fact that the testimony of the medical witness called by the plaintiffs conflicted with all the other medical testimony affect this rule, since the testimony of one credible witness, if believed by the jury, is sufficient to support a verdict.

The court further held that the question as to the patient's contributory negligence in treating her foot as she did before calling the defendant physician was for the jury's valuation and that the plaintiffs' medical witness's testimony supported the finding that the defendant physician's negligent treatment was the proximate cause of the serious results that followed.

The plaintiffs' medical witness was asked on cross examination if during prohibition his federal license to prescribe liquors had not been revoked. He answered: "No." The defendant then attempted to introduce a certified copy of an order revoking this license. The trial court, said the appellate court, properly sustained an objection to this. The credibility of the witness could not be attacked by evidence of specific wrong doing, if this could be so construed, and, the inquiry having been directed to a collateral matter, the defendant was bound by the witness's answer.

The judgment in favor of the plaintiffs was accordingly affirmed.—*Sales v. Bacigalupi*, 117 P. (2d) 399 (Cal., 1941).

Society Proceedings

COMING MEETINGS

- Alabama, Medical Association of the State of, Montgomery, Apr. 21-23. Dr. D. L. Cannon, 519 Dexter Avenue, Montgomery, Secretary.
American Association of Anatomists, New York, April 1-3. Dr. Eliot R. Clark, Dept. of Anatomy, University of Pennsylvania School of Medicine, Philadelphia, Secretary.
American Association of Industrial Physicians and Surgeons, Cincinnati, Apr. 13-17. Dr. Edward C. Holmblad, 28 East Jackson Blvd., Chicago, Managing Director.
American Association of Pathologists and Bacteriologists, St. Louis, April 2-5. Dr. Howard T. Karsner, 2085 Adelbert Rd., Cleveland, Secretary.
American College of Physicians, St. Paul, Apr. 20-24. Mr. E. R. Loveland, 4200 Pine St., Philadelphia, Executive Secretary.
American Federation for Clinical Research, Minneapolis, Apr. 20-21. Dr. Thomas M. Durant, 3401 North Broad St., Philadelphia, Secretary.
American Physiological Society, Boston, March 30-April 4. Dr. Carl J. Wiggers, 2109 Adelbert Rd., Cleveland, Secretary.
American Society for Experimental Pathology, Boston, April 1-3. Dr. Harry P. Smith, Medical Laboratory Bldg., Iowa City, Secretary.
American Society for Pharmacology and Experimental Therapeutics, Boston, March 31-April 4. Dr. Raymond N. Dieter, University of Minnesota Medical School, Minneapolis, Secretary.
American Society of Biological Chemists, Boston, Apr. 7. Dr. A. K. Balls, Bureau of Agricultural and Engineering Chemistry, Washington, D. C., Secretary.
American Surgical Association, New Orleans, Apr. 6-8. Dr. Charles G. Mixer, 319 Longwood Ave., Boston, Secretary.
Federation of American Societies for Experimental Biology, Boston, March 31-April 4. Dr. D. R. Hooker, 19 West Chase St., Baltimore, Secretary.
Florida Medical Association, Palm Beach, Apr. 13-15. Dr. Shaler Richardson, 111 West Adams St., Jacksonville, Secretary.
Iowa State Medical Society, Des Moines, Apr. 15-17. Dr. Robert L. Parker, 3510 Sixth Ave., Des Moines, Secretary.
New Jersey, Medical Society of, Atlantic City, Apr. 21-23. Dr. Alfred Stahl, 55 Lincoln Park, Newark, Secretary.
Tennessee State Medical Association, Memphis, Apr. 14-16. Dr. H. H. Shoulders, 706 Church St., Nashville, Secretary.

Current Medical Literature

AMERICAN

The Association library lends periodicals to members of the Association and to individual subscribers in continental United States and Canada for a period of three days. Three journals may be borrowed at a time. Periodicals are available from 1932 to date. Requests for issues of earlier date cannot be filled. Requests should be accompanied by stamps to cover postage (6 cents if one and 18 cents if three periodicals are requested). Periodicals published by the American Medical Association are not available for lending but can be supplied on purchase order. Reprints as a rule are the property of authors and can be obtained for permanent possession only from them.

Titles marked with an asterisk (*) are abstracted below.

Iowa State Medical Society Journal, Des Moines

31:563-618 (Dec.) 1941

- Certain Considerations of Coronary Disease. F. A. Willius, Rochester, Minn.—p. 563.
Significant X-Ray Findings in Heart Disease. H. C. Bone, Des Moines.—p. 569.
Hypersensitiveness of Conjunctiva and Cornea: Report of Case. H. C. Kluever, C. H. Coughlan and L. M. Martin, Fort Dodge.—p. 572.
*Relation of Thyroid Gland to Menstrual Bleeding. R. M. Collins, Council Bluffs.—p. 576.
Diagnosis of Gallbladder Disease. E. H. Sibley, Sioux City.—p. 578.
Practical Application of Obstetric Analgesia. C. W. Seibert, Waterloo.—p. 583.
Decreasing Mortality Rate of Appendicitis. F. W. Mulsow, Cedar Rapids.—p. 585.

The Thyroid and Menstrual Bleeding.—Collins points out that thyroid is indicated for the patient with a slightly subnormal basal metabolic rate who has menstrual disorders, sterility and the likelihood of abortion but that if the rate is slightly elevated compound solution of iodine is indicated. The menstrual and general symptoms in the two types of patient may be identical. In patients with menorrhagia, amenorrhea, dysmenorrhea, sterility and tendency to abortion, hypothyroidism prevails but hyperthyroidism is not uncommon.

Journal of Nervous and Mental Disease, New York

94:669-796 (Dec.) 1941

- Monstrosity Due to Intrauterine Purulent Meningoencephalitis. H. N. Roback, Cuyahoga Falls, Ohio, and H. F. Kahler, Medical Lake, Wash.—p. 669.
Challenge of Social Neuroses. W. Eliasberg, New York.—p. 676.
Pneumographic Patterns During Convulsive Therapy of Schizophrenia. E. Friedman, Norwich, Conn., and H. Barry Jr., Boston.—p. 688.
Narcoleptic Cataplectic Syndrome—Excessive and Dissociated Reaction of Sleep Mechanism—and Its Accompanying Mental States. S. Brock and B. Wiesel, New York.—p. 700.
*Familial Periodic Paralysis Associated with Exophthalmic Goiter. Alice G. Hildebrand and E. J. Kepler, Rochester, Minn.—p. 713.
Epilepsy and Suicide. C. Prudhomme, Tuskegee, Ala.—p. 722.
Hallucinosus as Clinical Entity and Its Interpretation. A. Gordon, Philadelphia.—p. 732.

Familial Periodic Paralysis.—Hildebrand and Kepler state that exophthalmic goiter has been encountered at the Mayo Clinic in 5 of 16 patients with familial periodic paralysis. Thyroidectomy resulted in the relief of both conditions in all 5 patients.

Kentucky Medical Journal, Bowling Green

39:499-538 (Dec.) 1941

- Surgery of Spleen. D. P. Hall, Louisville.—p. 501.
Value of Gastric Analysis. F. M. Stites, Louisville.—p. 507.
Evolution of Walkingiron, Turnbuckle and Joint Hinge in Fractures. M. Casper, Louisville.—p. 510.
Poliomyelitis. J. O. Nall, Marion.—p. 513.
Recent Advances in Treatment of Contagious Diseases. J. W. Bruce, Louisville.—p. 518.
False Security in Artificial Pneumothorax. P. A. Turner, Louisville.—p. 521.
Temporomandibular Joint in Relation to Eye, Ear, Nose and Throat. J. K. Hutcherson, Louisville.—p. 523.
Physician's Contribution to Religion and Human Society. W. M. Grieslaum, Louisville.—p. 526.
*Sequelae of Childbirth. D. M. Cox, Louisville.—p. 528.

Nebraska State Medical Journal, Lincoln

26:415-450 (Dec.) 1941

- Role of the General Medical Man in Prevention of Blindness by Early Diagnosis of Glaucoma and Other Causes of Blindness. H. S. Gradle, Chicago.—p. 415.
Diagnosis and Treatment of Vesicular Eruptions of Hands and Feet. S. W. Becker, Chicago.—p. 419.
Irradiation Therapy of Cancer of Breast. A. F. Tyler, Omaha.—p. 424.
Some Clinical Aspects of Leukemia. E. B. Reed, Lincoln.—p. 429.
Later Developments in Nutrition Applicable to Surgical Problems. C. W. McLaughlin Jr., Omaha.—p. 434.
Aids in Refraction. J. H. Judd, Omaha.—p. 438.

New England Journal of Medicine, Boston

225:845-888 (Nov. 27) 1941

- Fatigue in Aircraft Pilots. R. A. McFarland, Boston.—p. 845.
*Treatment of War Wounds of Brain. G. Horrax, Boston.—p. 855.
War Neuroses. D. A. Thom, Boston.—p. 864.
Blood and Blood Substitutes in Treatment of Hemorrhage, Secondary Shock and Burns. S. Mudd and E. W. Flosdorf, Philadelphia.—p. 868.
Isoimmunization in Relation to Intragroup Hemolytic Transfusion Reactions. S. B. Hooker, Boston.—p. 871.

Treatment of Cerebral War Wounds.—Horrax believes that some infections of head wounds would be prevented and some minimized if all active soldiers would have their hair cropped closely. Two other prophylactic measures are immediate administration of tetanus toxoid to all patients with compound injuries and early oral medication with a derivative of sulfanilamide. As far as surgical shock will permit, operative treatment, when indicated, should be undertaken within twelve hours of injury or earlier if possible. Other wounds of the body should also receive immediate treatment. The preoperative preparation of the patient with a wound of the head consists of stereoscopy of the head in the lateral, anteroposterior and posteroanterior positions. The whole head should then be shaved and examined for wounds of the skull. A brief neurologic examination is indicated. Not more than $\frac{1}{8}$ to $\frac{1}{4}$ grain (0.008 to 0.01 Gm.) of morphine may be given half an hour before operation and then only if the patient is conscious. Local anesthesia is usually indicated for gunshot wounds of the skull and of the brain. If the initial preoperative dose of morphine has not quieted the patient a second dose may be given during the operation. When local anesthesia cannot be used, anesthesia with ether or with a combination of avertin with amylene hydrate and ether is probably best. The operative treatment for all compound injuries is thorough and careful débridement of all contaminated tissues and removal, whenever possible, of foreign bodies and retained fragments of bone without adding damage to the surrounding areas. If the patient can be observed by the operator for ten days to two weeks and the operation is performed within twelve hours of injury the wound should be closed without drainage. With the oral or intravenous use of sulfanilamide derivatives and the local instillation of sulfanilamide or sulfathiazole powder many more wounds can be closed completely than was possible before the advent of chemotherapy. After operation tetanus antitoxin should be given intramuscularly, and the administration of gas gangrene antiserum is also advisable. If signs of contusion under the fractured area are evident an area of bone should be removed and the dura inspected. If the dura is tense and darkly discolored there is probably an underlying clot, and if débridement has been complete the dura should be incised, the clot evacuated and the dura resutured completely and carefully with fine silk. The author divides wounds with dural penetration caused by missiles of war into five groups and discusses the particular treatment for each: (1) the gutter type of wound, in which the missile has made a furrow through the scalp with fragments of bone, hair and clothing penetrating the underlying brain; (2) simple penetrating wounds, usually due to a large single metal fragment carrying with it fragments of bone and other debris and lodging these somewhere within the brain; (3) penetrating wounds from multiple fragments, particularly bomb splinters; (4) through and through, or perforating, injuries, usually with a small wound of entrance and a much larger wound of exit, with a certain number of fragments of bone scattered along the track, and (5) wounds involving one or another of the air sinuses, in which subsequent complications (leakage of cerebrospinal fluid or intracranial aerocele) may develop. Patients who have been

operated on should be watched carefully for ten days or longer. If infection develops the wound should be reopened and left widely open and a drain of gutta-percha or some other rubberized material should be used against the raw area of brain. When these wounds do not heal by primary union the outcome is not hopeless, as many of them finally heal with careful treatment. Frequently, even a herniation or a fungus eventually granulates and recedes and the wound epithelizes. Other acute postoperative complications are meningitis and diffuse encephalitis, and these can be treated only by keeping the pressure down by frequent lumbar punctures and by the general use of a specific derivative of sulfanilamide. Mucus in the air passages must be repeatedly cleaned out by suction to prevent atelectasis or some other pulmonary complication.

Rocky Mountain Medical Journal, Denver

38:833-936 (Nov.) 1941

- Pattern for Public Education R. L. Stearns, Boulder, Colo.—p. 850
Relation of Problems of Industrial Medicine to Medical Preparedness. C. M. Peterson, Chicago—p. 856
Physician's Place in National Defense. J. F. Sharp, Salt Lake City.—p. 860.
Mycotic Infection in Northeastern Colorado Epidermophyton of Animal Origin A. E. Lubchenko, Sterling, Colo.—p. 862

38:937-1024 (Dec.) 1941

- Medicine Prepares R. G. Leland, Chicago—p. 934
Medical Aspects of Selective Service in Colorado P. W. Whitley, Denver—p. 957.
The Physician in National Defense R. A. Bier, Washington, D. C.—p. 961.
Appreciation of the Colorado Medical Profession R. L. Carr, Denver.—p. 969.
Cardiac Irregularities Their Significance and Treatment J. F. Churchill, San Diego, Calif.—p. 971
The Acutely Ill Child Clinical Consideration. J. M. Rector, San Francisco—p. 978

Southern Medical Journal, Birmingham, Ala.

34:1217-1308 (Dec.) 1941. Partial Index

- Giants of Yesterday. P. H. Ringer, Asheville, N. C.—p. 1217
The Sterile Couple Analysis of Some Diagnostic and Therapeutic Data. E. C. Hamblen, Durham, N. C.—p. 1229.
Internal Podalic Version and Breech Extraction, with Comments on Recent Five Year Survey J. W. Reddock, New Orleans—p. 1234
Indication for Therapeutic Abortion in Diabetes Mellitus Case Report. J. H. Brady, Visalia, Calif.—p. 1238
Spontaneous Rupture of Spleen H. Dudgeon Jr., Waco, Texas—p. 1247.
Roentgen Management of Uterine Fibroids E. C. Ernst, St. Louis—p. 1249.
Subcutaneous Fibroid Syphilomas of Elbows and Knees: Report of Two Cases L. E. Nolan and R. H. Jones, Montgomery, W. Va.—p. 1255.
Ventricular Aneurysm D. C. Browne and G. McHardy, New Orleans.—p. 1257.
*Pustular Bacterids and Allied Conditions G. C. Andrews, New York, and M. C. Barnes, Waco, Texas—p. 1260
*Vitamin K in Other Than Hemorrhagic Diseases. W. B. Rawls, New York—p. 1266
Observations on Health Progress of Negroes in United States During Past Two Decades P. B. Cornely, Washington, D. C.—p. 1283
Boric Acid Poisoning Case Report H. A. Peyton, Jacksonville, Fla. and D. Green, Memphis, Tenn.—p. 1286
Potassium Permanganate Poisoning Report of Thirty One Cases D. Green and O. S. Warr, Memphis, Tenn.—p. 1288

Pustular Bacterids.—Andrews and Barnes believe that pustular lesions on the palms and soles are not pustular psoriatic lesions but rather bacterids occurring in patients with psoriasis. Pustular bacterids of the hands and feet are characterized by the following features: 1. They are chronic, symmetrically located, recalcitrant vesicular and pustular eruptions. 2. The condition has a direct relationship to focal infection. Cure results when the focal infection is removed. 3. Leukocytosis is usually present. It develops especially at the time of an exacerbation. 4. Cultures of material from the lesions are often sterile. 5. Positive cutaneous reactions are obtained to staphylococcus and streptococcus extracts, but this is perhaps of slight significance. 6. Microscopic study shows pustules deep in the epidermis, without much inflammation and without much acanthosis and parakeratosis. The microscopic changes resemble those of trichophytids.

Vitamin K for Nonhemorrhagic Diseases.—Rawls determined the prothrombin level in twenty-six nonhemorrhagic diseases and studied the effect of vitamin K on the prothrombin level in those in which it was found to be low. In osteoarthritis the mean level was 77 per cent. Treatment with vitamin K increased the level to an average of 95 per cent. The mean prothrombin level in gouty arthritis was 65 per cent. After the administration of vitamin K the level rose to 85 per cent. In 4 patients with cirrhosis of the liver the mean prothrombin level was 37 per cent, and it returned to normal with the administration of vitamin K. In carcinoma of the liver the mean prothrombin level was 48 per cent and the increase following vitamin K therapy seemed to vary with the stage of the disease and the amount of hepatic damage present. The author's observations on obstructive jaundice agree with those of other investigators that the low level can be decidedly increased by the administration of vitamin K and bile salts. The mean prothrombin level in chronic intestinal diseases (mucous colitis, ulcerative colitis, amebic dysentery with secondary anemia, chronic intestinal obstruction and chronic diarrhea) was 62 per cent, and with the administration of vitamin K it was increased to 90 per cent. The prothrombin level was also low in myelogenous leukemia, aplastic anemia, thrombocytopenia, hyperthyroidism, avitaminosis B, toxicity from gold salts and malignant endocarditis.

Southern Surgeon, Atlanta, Ga.

10:849-918 (Dec.) 1941

- Free Full Thickness Skin Graft for Relief of Burn Contracture of Neck T. G. Blocker Jr., Galveston, Texas—p. 849.
Ruptured, Gangrenous Left Sided Appendicitis: Report of Case. W. C. Kennedy, Florence, Ala.—p. 858
Congenital Hydrocephalus Complicating Labor: Report of Cases E. M. Wilder and L. F. Moldavsky, Baltimore—p. 861.
Exteriorization of Colonic Cancers. C. Rosser, Dallas, Texas—p. 874
Secondary Intrarectal Solid Teratoma of Ovary M. H. Pulskamp, R. A. Griswold and F. L. Blair, Louisville, Ky.—p. 880.
Hemangioma of Terminal Ileum with Recurrent Hemorrhages from Rectum. R. J. White, Fort Worth, Texas—p. 886
Liposarcoma of Stomach: Report of Case M. J. Abrams, Brewton, Ala., and J. S. Tuberville, Century, Fla.—p. 891.

Tennessee State Medical Assn. Journal, Nashville

34:423-462 (Nov.) 1941

- Aviation Medicine and New Stresses in Flying J. C. Adams, Washington, D. C.—p. 423
Classification of Pneumonias T. Mitchell, Memphis—p. 434.
Specific Treatment of Pneumonia O. N. Bryan, Nashville—p. 437.
Nonspecific Treatment of Pneumonia E. R. Zemp, Knoxville—p. 439
Prognostic Index in Pneumonia R. P. McCombs, Philadelphia—p. 443.

West Virginia Medical Journal, Charleston

37:529-576 (Dec.) 1941

- Treatment and Healing of Operative Wounds H. A. Bailey, in collaboration with J. C. Condry, Charleston—p. 529
Some Rhinologic Aspects of Chronic Bronchial Asthma R. W. Chambers, Beckley—p. 542.
Postpartum Care of Cervix. C. Goodhand, Parkersburg—p. 547.
Role of Chemotherapy in Prevention and Control of Spreading Infections I. S. Ravdin, Philadelphia—p. 549
Instructions To Be Given the Sterile Couple. A. P. Hudgins, Charleston—p. 556.

Yale Journal of Biology and Medicine, New Haven

14:121-228 (Dec.) 1941

- Origin of Cancer in Man in Light of Experimental Cancer Research W. Cramer, St. Louis—p. 121.
Effect of Local Application of Sulfonamides on Cerebral Tissue M. Taffel and W. J. German, New Haven, Conn.—p. 139
Observations on Response in Vitro of Pneumococcus, Staphylococcus, Alpha Hemolytic Streptococcus and Friedländer's Bacillus to Sulfonamide Drugs J. B. Tredway and J. F. Sadush Jr., New Haven, Conn.—p. 143
Effect of Surface Tension Depressants on Certain Serologic Systems Lida F. Holmes, Iowa City—p. 155
Effect of Combining Bacterial Toxins and X Ray Irradiation in Treatment of Transplantable Mouse Carcinoma E. A. Lawrence and F. Duran Reynolds, New Haven, Conn.—p. 177
Meat Extractives and Nonprotein Nitrogen of Blood F. Mylman and M. C. Wintermize, New Haven, Conn.—p. 183
Anesthesia and the Electromotive Force of Nervous System. P. J. Harman, Washington, D. C.—p. 189
Effect of Nonsuckling and Nonremoval of Milk on Individual Mammary Glands in Lactating Mouse W. L. Williams, Rochester, N. Y.—p. 201.
Weight of Normal Heart in Adult Males P. D. Roschke, New Haven, Conn.—p. 209.

FOREIGN

An asterisk (*) before a title indicates that the article is abstracted below. Single case reports and trials of new drugs are usually omitted.

Archives of Disease in Childhood, London

16:147-210 (Sept.) 1941

Calory Requirements of Full Term and Premature Infants in Neonatal Period: Formula, Its Uses and Limitations. Helen M. M. Mackay.—p. 166.

*Comparison of Value of Crystalloid Solutions, Whole Blood and Blood Plasma in Treatment of Dehydration in Infancy. A. G. V. Aldridge.—p. 182.

Treatment of Dehydration in Infancy.—Aldridge states that physiologic solution of sodium chloride should not be used routinely in the treatment of dehydration brought on by gastroenteritis, for in many infants there is an apparent, if not an actual, accumulation of chloride in the blood which may increase on further administration of chloride. The routine use of whole blood is also not recommended as usually the blood, which is already concentrated, becomes even more so after transfusion. When blood transfusion is considered the hematocrit reading, and preferably the erythrocyte count and the hemoglobin concentration, should be estimated. If these are above normal transfusion is not desirable. For infants with a decided hemocentration who require more drastic measures than the parenteral administration of crystalloid solution the transfusion of plasma is recommended.

British Journal of Dermatology and Syphilis, London

53:299-332 (Nov.) 1941

Pyodermitis Végétante (Hallopeau): Case. W. N. Goldsmith.—p. 299.
Influence of Time, Place and Contemporary History on Dermatologic Practice. T. Davies.—p. 319.

British Journal of Radiology, London

14:343-376 (Nov.) 1941

Dosage Control of Interstitial Radium Treatments by Direct Measurement of Skin Dosage Rate. W. G. Evans and H. D. Griffith.—p. 345.
Congenital Duodenal Obstruction. R. A. K. Harper.—p. 360.
Unusual Sequela to Gastroscopy. J. D. White.—p. 364.
Simple Device for Intracavitary "Contact" Therapy. T. A. Watson.—p. 366.

Mucous and Salivary Gland Tumors: Report on Series of Fifty-Seven Cases, with Special Reference to Radium Treatment. M. Lederman.—p. 368.

British Medical Journal, London

2:641-680 (Nov. 8) 1941

*Preparation and Use of Concentrated Red Cell Suspensions in Treatment of Anemia. G. E. O. Williams and T. B. Davie.—p. 641.
Mycosis Fungoides Treated by Malaria, Terminating in Hodgkin's Disease. H. MacCormac.—p. 645.

*Trinitrotoluene Health Hazard. H. M. Roberts.—p. 647.
Problem of Operation for Retroverted Uterus. Coralie Rendle-Short.—p. 649.

Simple Operation for Reduction of Fractures of Os Calcis. W. G. Campbell.—p. 651.

*Effects of Evacuation and Air Raids on City Children. W. Mary Burbury.—p. 660.

Erythrocyte Suspensions in Anemia.—Williams and Davie have given 35 patients with anemia transfusions of concentrated suspensions of erythrocytes separated from plasma. Large scale preparation of plasma from stored blood makes available considerable quantities of erythrocytes in concentrated form. In view of their potential value in the treatment of anemia it is regrettable that the cells are usually discarded. For the preparation of concentrated suspensions of erythrocytes, the aspirating needle, after the plasma is aspirated, is plunged to the bottom of the layer of erythrocytes and aspiration of the cells is continued into a fresh sterile bottle. The layer of gelatinous material on the surface of the erythrocytes is left in the bottle. The drops of cells remaining in the needle and tubing are used for grouping and cross matching. The erythrocytes of another bottle of blood of the same group, and, if necessary, of a third bottle, are added to those of the first. The concentrated suspensions are usually prepared at the request of the clinician, but at times it may be convenient to anticipate the demand by preparing a small stock of the different groups of cells. This can be stored in the refrigerator for forty-eight hours, after which time if it is not used it should be discarded. When

concentrated suspensions of erythrocytes are to be given in any quantity the flow should be regulated to approximately 100 cc. an hour to avoid cardiac embarrassment. The suspensions should be used only for patients with chronic anemia who require a rapid replacement of hemoglobin and erythrocytes with a minimal increase of the circulating blood volume. Irrespective of the nature of the condition causing the anemia, transfusion of one bottle of 500 cc. of the concentrated suspension generally raises the hemoglobin between 10 and 12 per cent. The reactions following seventy-seven transfusions were considerably less than that expected to occur when stored whole blood is used.

Health Hazard of Trinitrotoluene.—Roberts points out that workers with trinitrotoluene may be affected by (1) the inhalation of the fumes of molten trinitrotoluene, (2) the inhalation of its dust into the nose, mouth and throat, with subsequent ingestion and (3) the cutaneous absorption from contact with trinitrotoluene in any of the forms mentioned. The schedule for the control of the hazard includes (1) selection of workers, (2) recording of their physical condition on entry, (3) recording of absences due to sickness, (4) periodic examinations for signs of trinitrotoluene absorption, (5) keeping a record of trinitrotoluene stains on hands, feet, underclothing (shirts and stockings) and overalls, (6) cooperation with the works chemist in carrying out the Webster test, (7) an arrangement that foremen, chargemen, supervisors or other responsible persons draw attention to workers looking piqued and to those complaining of fatigue or breathlessness, (8) insistence on protective clothing, control of dust by adequate ventilation and the washing of the hands before all meals and of the hands and the face before going home and (9) alternative work for workers who may be affected or are affected and will not admit it. Physicians in munitions areas must not believe that contact with trinitrotoluene always creates sickness. In a large munitions works manufacturing trinitrotoluene for sixteen years there has not been a single instance of serious illness, and many of the workers have been on the job all the time.

Effects of Evacuation and Air Raids on Children.—Burbury observed the effects of evacuation (and subsequent return to their homes) and of air raids on 131 children. The request for aid in some instances came because of the onset or intensification of some disorder since the war had begun. It came from a billet to which the child was evacuated, from the child or from the parents. Study revealed that some children had had behavior disorders before the war, that others came from unhappy homes and that others were lonesome away from home. Regarding the complaints, whatever the outcome, the immediate effect of evacuation (separation from parents and a known and accepted environment) is worse than the immediate effect of raiding; the waking or dream fantasy of the raid is provocative of a greater anxiety than the reality. Children were more anxious and disturbed by talk of raiding or the sound of sirens than by the raids themselves.

Irish Journal of Medical Science, Dublin

No. 189:509-540 (Sept.) 1941

Prothrombin: Its Estimation, Clinical Significance and Treatment of Hypoprothrombinemia. M. Toohey.—p. 509.

Case of Chorionepithelioma Complicated by Staphylococcal Septicemia Successfully Treated with Sulfathiazole. E. Solomons and D. Mitchell.—p. 533.

No. 190:541-572 (Oct.) 1941

Dextrocardia (Situs Inversus Viscerum) with Atrial Septal Defect. P. T. O'Farrell.—p. 541.

Left Heart Failure. J. Lewis.—p. 548.

Urinary Excretion of Sulfapyridine. A. E. A. Werner.—p. 558.

Hysterical Edema. M. J. Mullen and E. L. Murphy.—p. 561.

Practitioner, London

147:673-736 (Nov.) 1941

Obstetrics. J. Wyatt.—p. 673.

Anesthesia and Analgesia. C. L. Hewer.—p. 676.

Diseases of Respiratory System. W. D. W. Brooks.—p. 683.

Diseases of Kidney. R. Platt.—p. 691.

Diseases of Skin. J. T. Ingram.—p. 697.

Diseases of Eye. Ida Mann.—p. 703.

Diseases of Ear, Nose and Throat. J. H. Otty.—p. 708.

Vincent's Infection of Mouth. C. E. Kellett.—p. 714.

Coronary Thrombosis: Autopathography. H. W. Bayly.—p. 718.

Minor Surgery: V. Minor Surgery of Mouth. R. L. Newell.—p. 722.

Ophthalmologica, Basel

102:65-128 (Aug.) 1941

Etiology of Uveoparotid Fever (Heerfordt's Syndrome, Besnier-Boeck-Schaumann Disease). M. Appelmans and A. Van Horenbeek.—p. 65.
Tumor of Optic Nerve and Its Leptomeninges in Recklinghausen's Disease. H. Goldmann and E. Grünthal.—p. 79.

***Causes of Senile Cataract.** Review of Present Status of Science. J. de Ruyter.—p. 93.

102:129-192 (Sept.) 1941

Rhabdomyosarcoma of Orbit. J. François.—p. 129.
Changes of Cornea and of Conjunctiva in Boeck's Disease. C. Haldimann.—p. 138.

***Causes of Senile Cataract.** J. de Ruyter.—p. 146.
Action of Low Pressure on Eye. H. F. W. Dubois and F. P. Fischer.—p. 164.

Causes of Senile Cataract.—De Ruyter summarizes the causes of senile cataract and the results of physical, chemical and clinical investigations. He raises the question as to what causes death of the cells in the lenticular fibers. Increased knowledge of life processes of the lens indicate that the causes are many. Senile cataract, the gradual decay of the cortical lenticular fibers which leaves a cell corpse behind, cannot be considered a disease entity. Death of the lenticular fibers can be caused by the aging process, by changed permeability and changed function of the lenticular epithelium or capsule (as elements of the lens fiber-aqueous humor barrier) and by defects in the blood vessels of the corpus ciliare, in the secretory function or in other elements of the blood-aqueous humor barrier. Electromagnetic oscillations may cause cataract. Defects which impair the composition of the blood, such as disturbances in the intestinal absorption of vitamins, disorders of the secretory glands (liver, thyroid, pancreas) and impairment of the regulatory mechanism for many blood constituents may also be causal factors. There exist factors in aged persons which inhibit the carbohydrate intake of the lens. 1. The dextrose content of the aqueous humor is reduced. 2. The absorption of dextrose from the aqueous humor is impaired. 3. Hexose is not readily converted into hexose-diphosphoric acid and thus cannot be reached by decomposition ferments. 4. The permeability of the lenticular capsule is reduced. Thus the lenticular capsule is inadequately supplied with carbohydrates, a factor which may readily lead to cataract. Clinical manifestations of cataract have thrown little light on possible causes. Detection of metabolic defects which may cause cataract is difficult, because they may act only intermittently. It has been definitely established that hereditary predisposition plays a part in the pathogenesis. Rational treatment of a cataract is impossible as long as its cause is not understood, and for this reason the author stresses the necessity of classifying cases of senile cataract on an etiologic basis.

Arq. do Serv. de Assist. a Psicopat. do São Paulo

6:1-242 (March-June) 1941. Partial Index

***Uric Acid in Cerebrospinal Fluid.** J. Baptista dos Reis and A. Lara Williams.—p. 133.
Neuroanemic and Psychoanemic Syndromes. F. Tancredi.—p. 215.

Uric Acid in Cerebrospinal Fluid.—Baptista dos Reis and Lara Williams direct attention to the clinical importance of the quantitative determination of uric acid in the cerebrospinal fluid as a means of ascertaining a lowered threshold of the hemato-cerebrospinal barrier in the presence of an increased amount of uric acid in the blood. The small amount of uric acid in the cerebrospinal fluid and the influence of the reducing substances which are used in the quantitative determination of the substance in the fluid make the procedure difficult. The authors describe a photometric method in which the quantitative determinations are made by means of a Pulfrich photometer and Benedict's method. They made quantitative determinations of uric acid in the blood and the cerebrospinal fluid of 200 patients with mental disease and in the cerebrospinal fluid of patients with nonpsychic disease. None of the patients with mental disease presented uricacidemia or retention of nitrogen substances in the blood. The authors found that the normal amount of uric acid in the cerebrospinal fluid varies from 0.1 to 0.4 mg. of the substance for each hundred cubic centimeters of fluid. The normal ratio of uric acid in the blood and the cerebrospinal fluid is 15:1. The amount of uric acid in cerebrospinal fluid

obtained by lumbar puncture is twice that which is contained in cerebrospinal fluid obtained by cisternal puncture. The amount of uric acid in the cerebrospinal fluid is increased in meningitis, cerebral hemorrhage, neurosyphilis and diabetes.

Bulletin of the Naval Medical Association, Tokyo

30:483-558 (Aug.) 1941. Partial Index

***Colon Bacillus Osteomyelitis.** T. Muto.—p. 516.

Colon Bacillus Osteomyelitis.—Muto reports a case of chronic osteomyelitis caused by the colon bacillus in a man aged 54 who at the age of 14 had been operated on for a similar illness. The patient had recovered from the operation, but at the age of 50 the condition recurred and similar surgical treatment was instituted. This time the wound failed to heal completely and left a fistula. Still later the operative treatment was twice repeated and the patient was discharged with only a narrow fistula. Cultures of the material obtained at operation repeatedly revealed moist, semitranslucent round colonies with smooth margins, negative to Gram stain. Bacteriologic studies identified the organism as *Escherichia coli* communior, and the osteomyelitis was thought to be hematogenous, although several cultures of the patient's blood and excreta, as well as the contents of the gallbladder and the duodenum, gave only negative results. Suppurative osteomyelitis caused by colon bacilli is relatively rare, the literature containing records of only 7 cases. The condition presents no special clinical or pathologic picture to differentiate it from osteomyelitis due to other pyogenic organisms.

Okayama-Igakkai-Zasshi, Okayama

53:1331-1526 (July) 1941. Partial Index

***Serologic Studies on the Anti Thrombocytic Serum.** I. Agglutination Reaction of the Anti Thrombocytic Serum. II. Effect of the Anti-Thrombocytic Serum on Plasma Coagulation. III. Effects of Anti Erythrocyte and Anti Visceral Immune Serums on Thrombocytosis, Blood and Plasma Coagulation. K. Shimizu.—pp. 1438, 1453 and 1466.

Anti-Thrombocytic Serum.—Shimizu reports his investigations on the nature of guinea pig serum immunized against rabbit thrombocytes. Immune serum of high titer can be obtained after four to five injections of a 2 per cent suspension of rabbit platelets at two to six day intervals. The agglutination titer of such serum, however, diminishes rapidly, until within thirty days the immune property has completely disappeared. When the anti-thrombocyte serum is injected into rabbits the circulating platelets of the inoculated animal tend to decrease at the end of the first hour but gradually return to the normal level; corresponding changes take place in the coagulation time of the plasma. When normal serum is injected, no such noticeable fluctuation of the platelets occurs and no influence whatever can be detected on the coagulation time of the plasma. The effect of anti-thrombocytic serum in rabbits closely resembles that produced by injection of soluble toxin of non-virulent colon bacilli. As judged from the agglutination reactions, the relationship between the platelets and erythrocytes appears to be more intimate than that between platelets and leukocytes. Injections of anti-platelet and anti-leukocyte serums in rabbits cause an almost immediate drop in circulating platelets and white blood cells, after which both these elements promptly return to their normal values; but such fluctuations in the erythrocytes are somewhat slower paced. When anti-erythrocyte serum is injected the blood platelets diminish in number, while the leukocytes tend to increase, naturally the coagulation time of the plasma appears to be definitely influenced by the quantitative changes in platelets. Injection of anti-bone marrow serum in rabbits produces a considerable reduction in the circulating platelets, while only a slight diminution occurs with administration of anti-spleen, anti-aorta and anti-kidney serum. Only the anti-bone marrow serum agglutinates blood platelets; all other types of serum giving entirely negative results. The same phenomenon is likewise observed when these serums are tested as to their precipitin reactions against platelet solution.

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Scholarship in Medicine

Scholarship is a kinetic condition which thrives best in an atmosphere of inquiry, investigation and exploration. It is nurtured on books and journals. Scholarship requires reading over a wide range of topics and texts. The narrow fields of specialism are consonant with scholarship, but he who restricts himself to such narrow fields is not a scholar. The scholar projects his interests, studies and investigations in all directions beyond the boundaries of his specialty.

Scholarship can be developed in the classroom, in the library, in the laboratory, in the clinic, in the practitioner's office. It is stimulated by leadership and the influence of other scholars, but scholarship cannot be passively absorbed. Its attainment requires work, study, denial of diverting calls hither and yon, resistance to the distractions and seductions of ephemeral pleasures.

The primal foundation of scholarship in medicine lies in work, diligent, absorbing, persistent work. He who does not work long hours cannot attain scholarship. The laggard and the lazy never become scholars. In one of his essays Osler said "I propose to tell you the secret of life as I have seen the game played, and as I have tried to play it myself. . . . I propose to give you the master word in the hope, yes, the full assurance, that some of you at least will lay hold upon it to your profit. . . . It is the open sesame to every portal, the great equalizer in the world, the true philosopher's stone which transmutes all the base metal of humanity into gold. The stupid man among you it will make bright, the bright man brilliant and the brilliant student steady. With the magic word in your heart all things are possible, and without it all study is vanity and vexation. The miracles of life are

with it; the blind see by touch, the deaf hear with eyes, the dumb speak with fingers. To the youth it brings hope, to the middle aged confidence, to the aged repose. . . . It is directly responsible for all advances in medicine during the past twenty-five centuries. Laying hold upon it, Hippocrates made observation and science the warp and woof of our art. Galen so read its meaning that fifteen centuries stopped thinking and slept until awakened by the De Fabrica of Vesalius, which is the very incarnation of the master word. With its inspiration Harvey gave an impulse which we feel today. Hunter sounded all its heights and depths and stands out in our history as one of the great exemplars of its virtues. With it Virchow smote the rock, and the waters of progress gushed out, while in the hands of Pasteur it proved a very talisman to open to us a new heaven in medicine and a new earth in surgery. Not only has it been the touchstone of progress, but it is the measure of success in everyday life. Not a man before you but is beholden to it for his position here, while he who addressed you has that honor directly in consequence of having had it graven on his heart when he was as you are today. And the master word is Work, a little one, but fraught with momentous consequences if you can but write it on the tables of your heart and bind it upon your forehead."

If the master word, Work, is the key to unlock the way to scholarship in medicine, it must be applied in large measure in reading. If the primal foundation of scholarship lies in work, then much of the structure of scholarship above the foundation is to be built of bricks gathered from the writings of men of the medical profession. In printed pages will be found the records of the work of the past necessary to the scholarship of the present. Reading is a habit which, once cultivated, continues and is one of the roads toward scholarship for each to follow

Condensation of an address by Dr. Henry A. Christian, Hersey professor of the theory and practice of physic emeritus, Harvard University, presented at the installation of a chapter of Alpha Omega Alpha in Tufts College Medical School, Boston, published in the Pharos of Alpha Omega Alpha, December 1940 and in the Diplomat January 1942.

and lined with innumerable pleasant impressions. The medical student should spend part of each day in reading. The student reads mostly in textbooks, but he should read also in current journals. For the medical student to be set the task of reading up some topic and making a report with bibliographic references is an excellent first step toward scholarship. The habit of going once a week to the library to browse over journals, reading titles, the names of authors and their place of work, dipping here and there into articles, reading the authors' conclusions, all of this is stimulating. The most effective textbook reading is to peruse the description of some disease suffered by a patient seen by you a short time previously; here you compare your personal observations with those of the author of the book; the clinical case helps to fix in your mind the textbook discussion of the disease; you have begun in this way to acquire clinical experience in relation to the understanding of a disease. Soon you will be turning automatically to systems of medicine and to journal articles to satisfy your longing for more extensive knowledge. This is the form of reading which is most helpful too after your school days are over, to read in connection with the patient recently seen in home and office.

I have been watching young men develop progressively in the clinic for years. I am convinced that those who read most extensively progress with greatest success in the profession. Those that go farthest, with few exceptions, began early to buy books and journals and to read them. A personal medical library is a valuable asset. The book right at hand is the book useful and actually used. The busier you become in medical work, the greater the importance to have books at hand in which to look for information about the problems of the day's work.

The habit of reading at least one hour daily will enable you to cover an amazing amount of medical literature. If you do this, each year you will have spent fifteen and one-half eight hour days in reading. I advise you to begin and to continue this habit. The more diligently and more extensively you read, the more you enjoy it. For him who attains scholarship the labor of reading long since has changed to a pleasure and satisfaction. There is often suggested as an excuse for not doing extensive and broadly distributed reading the plaint that so much is published that no one can read it all. The last is true, but multiplication of publica-

tion but increases the number of pages that will be useful to you in the solution of your individual medical problems. Only the lazy would excuse delinquency in reading by saying that too much is written. For the industrious, still it is possible to read widely and so develop what I consider a broad scholarship in medicine. To read much in the immediate field of one's special interest is necessary to success, but to me this is not true scholarship in medicine.

To the master word, Work, and to reading should be added investigation. To study some problem, some group of patients, in order to know more of that subject than others is another significant road to scholarship. For the medical man investigation should be part and parcel of the method of study of each patient. Every patient should be regarded as a problem on whose solution depends diagnosis and wise treatment. Thus he should use daily the methods of the investigator and so accumulate clinical data which may become useful in widening the fields of medical knowledge. Even such simple observations can carry the stimulus and satisfaction that comes to the more matured and skilled investigator. I advise every young medical man to undertake some form of sustained investigation. Attend medical meetings and contribute to them observations based on your own studies. A paper prepared for the local society will teach much of value to you.

The medical man needs a religion of some sort with which to help his sorely afflicted patients and with which to meet his own problems. Scholarship without a faith lacks in perfection and often fails in its utility. In another address Osler said: "Some of you will wander through all phases, to come at last, I trust, to the opinion of Cicero, who had rather be mistaken with Plato than be in the right with those who deny altogether the life after death: and this is my own *confessio fidei*." I may add that also it is my own, and in a very simple Faith, throughout life, I have found great solace and what has seemed to me an enrichment and broadening of such scholarship as I may have attained in a life in which the study of medicine has ever been a great joy.

Success in medicine in last analysis always has been based on scholarship, not by any means on erudition, but on that broad scholarship which constitutes knowledge. Medicine ever is changing; to meet the future, no preparation is more important than scholarship whose attainment has been begun early and steadily added

to. In this period of changing economics, of war, what is to happen in the future is known to no man; the unknown will be faced and solved most effectively by those that are best trained in their work. Those who have developed a broad scholarship will be the ones to lead medicine through any chaos that may come and to restore

it to its proper place in the solutions of the problems of health and of disease. The practical value of scholarship in medicine will be that it will bring success to those who diligently cultivate it. I have no skepticism about there being important places in the future, as in the past, for those highly trained in medicine.

Early Medical Education in the United States

In 1765, under the influence of John Morgan and William Shippen, two Edinburgh graduates, Benjamin Franklin's College of Philadelphia (University of Pennsylvania) opened a medical department, the first in the English speaking New World. Three years later, in 1768, Samuel Bard and five associates opened the School of Medicine of King's College in New York City. As soon as the war was over, John Warren, an army surgeon, sold the Harvard Corporation on a plan for a medical school, which opened in 1782. The first of the so-called country schools was founded in 1797 by a Connecticut Valley pioneer, Nathan Smith. It was the Medical School of Dartmouth College in Hanover, N. H. Four schools of medicine, then, were instituted before the close of the eighteenth century.

Any one of the thirty-two collegiate institutions established in the colonies or states by royal charter or legislative act before Jan. 1, 1801 had broad enough charters to confer medical degrees, whether they offered instruction in medicine or not. Indeed, three other institutions did attempt to institute medical departments: William and Mary College, 1779; Queen's College, 1793, and Transylvania University, 1779. The efforts of the first two proved abortive, and the latter was practically stillborn, being revived two decades later. Occasionally, honorary medical degrees were conferred by institutions with and without medical instruction. In all, twelve institutions during the eighteenth century granted three hundred and thirty-five medical degrees of all kinds. Thirty-nine of these were honorary and thirty-three were duplicates; therefore only three hundred and twelve candidates received degrees.

The first decade of the new century saw the opening of two more schools of medicine, the College of Physicians and Surgeons of New York City and the College of Medicine of Maryland, both of which had no collegiate connections but were sponsored and controlled by

medical societies. A disastrous precedent was established on Dec. 29, 1812, when the legislature of Maryland responded to a memorial of the president and professors of the College of Medicine of Maryland by passing an act creating the memorialists the body corporate and politic of the so-called Medical Department of the so-called University of Maryland.

With the passing of this act was established the first American proprietary school of medicine. A similar charter was granted to the Castleton Medical Academy. The bond of union between the collegiate institutions and their medical departments was frail enough, at best. Authorizing the establishment of entirely independent faculties of medicine with little or no balance in the way of personally disinterested trustees was a policy that characterized the American system of medical education for a century.

The evils of such a system are obvious. In 1819 there followed a veritable race in the founding of medical schools, which continued unabated until the impact of the Civil War temporarily brought the movement to a halt. Schools sprang up like mushrooms in coastal cities, in interior valleys of the Piedmont and in the expansive trans-Appalachian area from Michigan and Wisconsin to Alabama and Louisiana. Under the impetus of Far Western expansion, the movement reached the Pacific Coast in 1858 with the establishment of the Medical Department of the University of the Pacific.

Much of this rapid development was not complimentary to the American medical profession, but it was an enlightening exhibition of the life and work of professional men, undisciplined within and unregulated from without while they attempted giving medical care to a rapidly expanding democracy in which ingenuity was unhampered and personal liberty was glorified.—Norwood, William F.: *A History of Medical Education in the United States Before the Civil War*, *Harveian Review*, August 1941.

Medical College News

Medical schools, hospitals and individuals will confer a favor by sending to these headquarters original contributions, reviews and news items for consideration for publication in the Student Section.

Pittsburgh's Medical Students Teach in Defense Program

During the past autumn a committee of faculty members of the University of Pittsburgh worked on a plan to insure the safety of the thousands of persons who populate the campus, the forty story skyscraper "Cathedral of Learning" and other classroom and laboratory buildings. While the program was aimed at any sort of disaster which might strike the institution, the committee worked on two phases of preparation: one, disaster precautions and conduct of individuals; the other, provision for treatment of injuries. In the execution of this second phase Dr. Paul L. McLain and Capt. John P. Cameron of the Department of Military Medicine outlined the following plan:

1. Immediate training of men and women of all four classes of the School of Medicine in first aid teamwork and teaching.
2. Utilization of medical students to train first aid teams, composed of students in the undergraduate departments of the university.
3. Organization of treatment and evacuation stations, staffed by medical students and members of the faculty of medicine.
4. Development of a system of rapid evacuation of wounded to the university hospitals for treatment.

The medical students were divided into two groups under the immediate charge of four men with surgical or military experience. First came preliminary training of a small group of senior and junior students, largely from the advanced course of the medical R. O. T. C. unit. These men subsequently served as demonstrators, under faculty supervision, in the teaching of the larger two groups. Second came the course of training of the two large groups of medical students, consisting of about ten hour and a half sessions. The training of medical students conformed to the procedures of the American Red Cross first aid course. Third came a series of sessions between Christmas holidays and the midyear examinations, devoted to team function, assignment into permanent squads and organization for undergraduate instruction. Only a portion of the trained students are being used initially in the undergraduate program. The others serve as alternates and as a reserve.

At the second semester registration, students in the undergraduate schools of the University were asked to fill in forms listing their abilities and interests in the broad university defense program. At present the course in first aid consists of ten one hour sessions. With three class periods weekly, a course can be taught in three and a half weeks. Eighty men comprise a class; in the future, women's classes will be organized. Following explanation of the day's material, five squads of medical students demonstrate the procedures. After demonstration, the students split into squads and apply the technics under supervision of one of the medical student demonstrators. Each squad of undergraduates has its leader, and each man has specific duties but is required to be familiar with the duties of his fellows. The students soon learn the advantages of efficiency and speed that is developed by the system.

A system of evacuation by student automobiles, university cars and trucks, and ambulances to university hospitals for treatment has been set up. Until

the requisite number of undergraduate students have been trained, a group of senior medical students is on twenty-four hour call to the university health service headquarters for emergency duty. As the undergraduates are trained in groups they will take their place in the plan beside the medical students and medical faculty men.

The difficulties in organizing the project have been numerous. Many must be taught in order that a few capable persons may be well trained. It is a source of gratification that the medical students at Pittsburgh have found a contribution which they, with their faculty, may give to national defense before actually entering the service, besides the important one of furthering and completing their professional education.

War Effort of Loyola University School of Medicine

The dean's office submitted the following concerning the war efforts of Loyola University School of Medicine, Chicago:

STUDENT COMMISSIONS

In the freshman class there are eighty-two male students. Of this number sixty-eight, or 83 per cent, have made application for ensign H.-V. (P.) commissions in the Naval Medical Corps. Of the remaining fourteen most are waiting for similar opportunity to apply for Army commissions. It is hoped that this opportunity will be afforded them at an early date under the same scheme as that promulgated by the Navy recently.

In the sophomore class, of a student enrolment of sixty-five male students fifty-two, or 80 per cent, have made formal application and have stood physical examination for ensign H.-V. (P.) commissions. In the remaining thirteen there are at least two who in all probability will have to register under the Procurement and Assignment Act. Others are waiting for similar action by the Army as mentioned under the freshman class.

In the junior class of fifty-one male students twenty-two, or 43 per cent, have completed application for ensign H.-V. (P.) commissions. Two men who applied to the Navy and were rejected have applied for second lieutenantcies in the Medical Corps Reserve Pool. Eighteen, or 35 per cent, are commissioned in the Army. Eleven students, or 22 per cent, have for various reasons not made immediate application. The majority of these students delayed action owing to dependencies and physical disabilities.

In the senior class of sixty-two male students nineteen, or 30 per cent, have completed application for ensign commissions. A total of twenty-four applied, five of whom were rejected, mostly on the basis of vision. All these men have since applied for Army commissions. Thirty-one seniors, or 50 per cent of the class, have completed application for Army commissions. One senior has been rejected by both services. One senior has applied to the Public Health Service. One is an alien and one is ineligible because of postinfantile deformity. There are only nine seniors who have not yet completed application in either service.

The entire student body to date is, therefore, 61 per cent Navy and 19 per cent Army, and only 19 per cent have not taken action. The student body, therefore, has enrolled 80 per cent in the service. This per-

centage is constantly increasing as more and more students are coming to the dean's office for counsel in the matter of application and choice of branch of service.

FACULTY

To date eighteen faculty men have been called to active service. There has been a rumor that one member of the faculty was killed in action in the Philippines. One alumnus was killed at Pearl Harbor with the Navy, and there is semiofficial information that a second was killed at Cavite in the service of the U. S. Navy.

SELECTIVE SERVICE

The medical school has participated by the examination of selectees in the medical school building. Since the service began last June more than eight hundred selectees have been examined at the medical school for various local draft boards.

Western Reserve Goes on Continuous Session Plan

The dean of Western Reserve University School of Medicine, Cleveland, Dr. Torald Sollmann, writes that this school will go on the continuous session plan for all classes, beginning this June, and that the entering class is being enrolled on this basis.

Johns Hopkins to Hold Summer Sessions

The Johns Hopkins University Medical School, Baltimore, has decided to shorten the course of study for medical students for the duration of the war by holding summer sessions. The new academic year now will begin June 1, 1942 for the three upper classes and later in June for the incoming class and will end in February 1943. There will be a short vacation probably at the end of July. The Johns Hopkins Hospital has not as yet made any definite changes in its internship dates.

Classes Six Days a Week

In accordance with the new arrangement adopted by the Indiana University administrative council, medical students at that school will do in fourteen weeks the amount of work that has been done heretofore in eighteen weeks. The medical students will attend classes six days a week and the only vacations in the near future will be Good Friday, July 3-4 and Thanksgiving Day. The semester beginning February 16 will end May 10; the semester beginning May 12 will close August 22, and the first semester of next fall starting September 3 will continue until December 23. The medical faculty, which is composed chiefly of physicians serving part time without pay, has agreed to teach overtime despite the additional pressure that it will make on their private practice. The next entering class will comprise an additional number of students to a total of one hundred and twenty-eight members.

Vanderbilt Goes on Twelve Month Basis

Dr. W. S. Leathers, dean, is reported to have announced on December 19 that, to help meet the situation created by the war, Vanderbilt University School of Medicine, Nashville, will eliminate the usual summer vacations in order that medical students may complete the four year course of study in three years. Under this plan the first year students will begin their courses next July instead of next autumn, and students already enrolled will forego summer vacations in order to hasten their graduation.

Five New York Schools Go on Three Year Plan

The five medical schools in New York—Columbia University College of Physicians and Surgeons, Cornell University Medical College, New York University College of Medicine, New York Medical College and Fifth Avenue Hospital and Long Island College of Medicine—have arranged to accelerate their courses so that the usual four years of work can be accomplished in three years by making the courses practically continuous throughout the year with only short vacations between terms. The new arrangement is a cooperative effort to aid the government in providing sufficient doctors of medicine for the military services and at the same time see that a sufficient number is available to care for the civilian population. The five New York medical schools normally would graduate about 1,350 physicians in a three year period, but under the accelerated schedule this number will be increased to about 1,800 in the same period.

Minnesota Goes on Twelve Month Basis

At their meeting, January 2, the Executive Faculty of the University of Minnesota Medical School, Minneapolis, decided, subject to the approval of the Board of Regents, to:

1. Increase the enrolment in the freshman class to 125.
2. Accelerate the medical course by starting the next class at the beginning of the summer session and by omitting summer vacations, so that a student will graduate from the medical school in three calendar years after his admission. This will result in making available to the armed forces an increased number of physicians and will make them available from three to twelve months earlier than if the present schedule were continued. The accelerated curriculum and increased enrolment will be discontinued at the end of the war.
3. Discontinue comprehensive examinations during the war. Under the present system of comprehensive examinations a student who fails to pass them in the spring may take them again in the fall and, if he passes, go on without loss of time. Elimination of vacations would make it necessary for a student who failed in his examinations to wait at least nine months before going on with the work of the next year. For that reason they are being replaced by course examinations.
4. Instal a new junior-senior curriculum which spreads the lectures ordinarily concentrated in the junior year and the clinical work ordinarily concentrated during the senior year more evenly over the two years. This is intended to be permanent.

Defense Bond Campaign

Phi Delta Epsilon, national medical fraternity, has launched a campaign to sell U. S. Defense Bonds by mail to its 3,500 graduate members. The idea originated in the success of selling defense bonds at the recent national convention of the fraternity in New York City, where under the direction of Mrs. Rosalie Wolf, the wife of a physician, \$20,000 worth of bonds and stamps were sold simply by asking every one as he left the registration desk to buy them. Phi Delta Epsilon will use the group plan provided through the New York office of the Defense Savings Division, under which envelopes are addressed in the office of the group but material is sent out through the Defense Savings Office, where the records of pledges and payments are kept.

Columbia Students Take First Aid Courses

All medical students are taking the American Red Cross standard first aid course so that they may be prepared to be of service during an air raid and to participate in instruction of lay groups. Members of the senior class have been assigned to assume definite responsibilities at the Medical Center during an emergency. These students will work in cooperation with the Catastrophe Unit of the Medical Center.

First Aid Courses Compulsory

The University of Oklahoma School of Medicine, Oklahoma City, announces that beginning with the second semester of the present scholastic year an obligatory course in first aid for all seniors in the medical school was inaugurated. The school also arranged for an elective course in tropical medicine open to seniors and juniors.

Defense Stamp "Favors" for Student Dance

Wayne University, Detroit, announced that souvenir "favors" for the "University J-Hop" this year were related to the war effort. Each person attending the dance received a defense stamp book with one 25 cent stamp already mounted. The dance was held at the Masonic Temple Ballroom January 16.

Interns Sponsor Victory Carnival

The intern staff and the personnel at the Bronx Hospital, New York, sponsored a Victory Carnival and Dance, February 12, for the primary purpose of raising funds for Medical Aid for the Allies. Each person attending was given a ticket on a raffle of a \$25 defense bond. The ticket, costing 25 cents, was also the ticket of admission to the carnival.

Defense Stamps as Gifts at Christmas Party

The traditional annual Christmas party at Oklahoma University School of Medicine, Oklahoma City, was highly successful this year. Each one in attendance was given a present in the form of a defense stamp book, with just a "starter" in the corner.

Chairman of Student War Activities

Russell Lennox, a senior in Wayne University's College of Liberal Arts, Detroit, has been named chairman of Wayne's Student War Activities Committee to direct civilian defense participation of students in the various colleges and schools during the remainder of the school year. Other members of the committee and their assignments are: Louis McGuinness, "Blood Donors Day"; Betty Pickering, Victory Book Campaign; Barbara Berman, forum discussions on current problems; Shirley Williams, women's projects; Jack Barthwell, exhibits, and Harvey Barnett and Mabel Hamilton, Defense Stamp Sale.

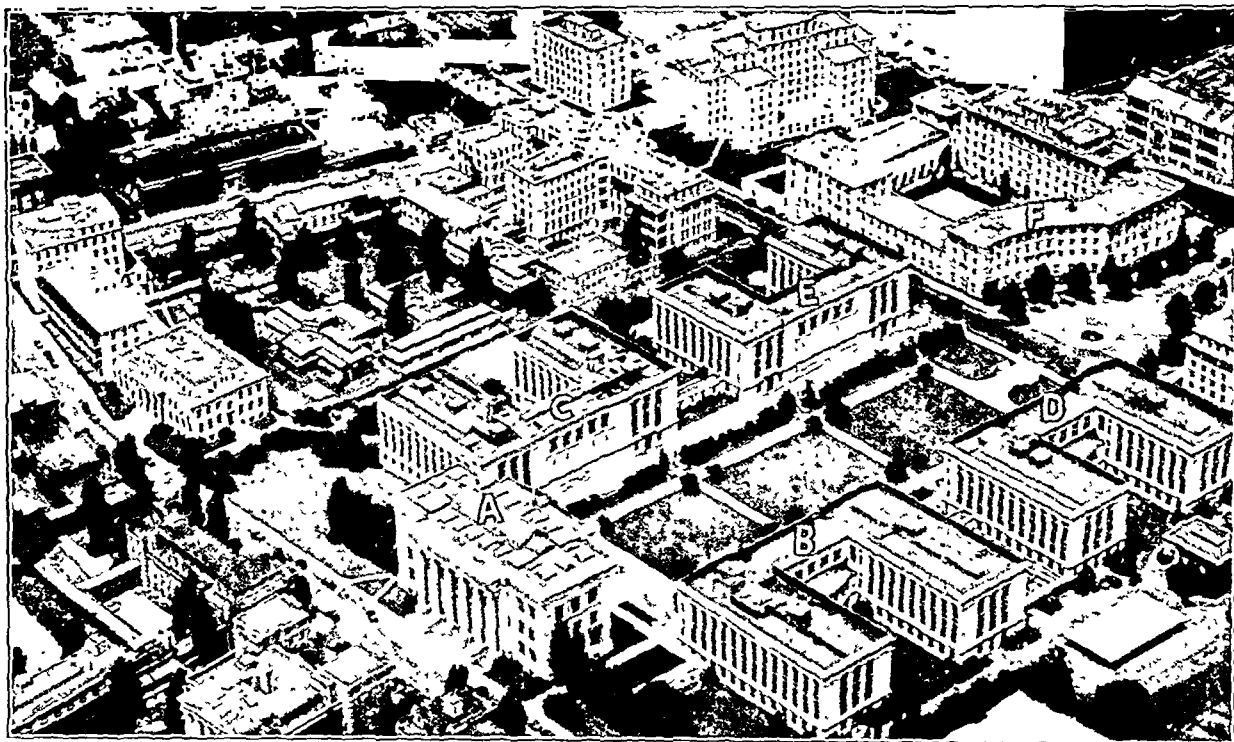
Graduation in February

The commencement of Louisiana State University School of Medicine was held in New Orleans, February 18, at the Municipal Auditorium, at which time Chauncey S. Boucher, chancellor of the University of Nebraska, was the guest speaker. His subject was "Education in the Emergency." A reception was held in the afternoon for the members of the graduating class and their families, and all departments of the school, as well as the Charity Hospital, were open for the guests.

Harvard Medical School

Harvard Medical School was opened as a branch of Harvard University in Cambridge, Mass., in 1782. The school was moved to Boston in 1810. The five white buildings on Longwood Avenue, now the home of Harvard Medical School, were opened in 1906. The laboratory buildings designated in the picture as B, C, D and E are constructed on the same general plan, each consisting of two parallel wings united at the front by an amphitheater with a seating capacity of two hundred and fifty. The departments of anatomy, histology and embryology are in building B, the departments of physiology, physical chemistry and biochemistry and experimental surgery are in building C, the departments of bacteriology, pathology and preventive medicine are in building D and the departments of pharmacology, legal medicine and comparative pathology and tropical medicine are in building E. The dormitory for medical students, Vanderbilt Hall (F) is immediately adjacent to the medical school buildings. A description of Vanderbilt Hall was published in the news columns of THE JOURNAL on Feb. 4, 1928, about the time it was dedicated. Previous to 1906 the clinical teaching was done mostly in the Massachusetts General Hospital and Boston City Hospitals, which are still used for teaching purposes. Other more recently built hospitals adjacent to or in the vicinity of the medical school have added greatly to the teaching facilities. Each student comes in intimate contact, under supervision, with patients in these hospitals, beginning in the second half of the second year and increasing until the fourth year, when the students serve as clinical clerks and give their whole time to the study of patients.

Massachusetts General Hospital has been associated with Harvard Medical School ever since the hospital was founded in 1821, and 439 of its 838 beds are available for teaching purposes, together with outpatient departments, to which 323,039 visits by patients were made last year. Of the 2,509 beds in the Boston City Hospital, 1,593 are available to the teaching units of Harvard Medical School. The 250 bed Peter Bent Brigham Hospital, which is adjacent to the medical school, has been closely associated with it since the hospital was opened in 1913; all its beds are used for teaching purposes, in addition to the outpatient service. Around the corner from the school on Brookline Avenue is the 215 bed Beth-Israel Hospital, where 120 beds are available for teaching. Nearby on Longwood Avenue is the 283 bed Children's Hospital, with 241 beds available for teaching, and the Infants' Hospital and the House of the Good Samaritan, with 83 beds devoted to patients with rheumatic fever and rheumatic heart disease. Other hospitals with beds available for teaching are the Collis P. Huntington Memorial Hospital and the F. Collins Warren Laboratory, which afford opportunity to study special problems concerning tumors, the New England Deaconess Hospital, where the George F. Baker Clinic is especially equipped for patients with diabetes and the study of that disease, the Palmer Memorial for the special study of cancer and chronic disease, the Middlesex County Sanatorium with 400 beds available for teaching particularly in pulmonary tuberculosis, the Free Hospital for Women, devoted to the surgical treatment of women's diseases, and the Massachusetts Eye and Ear Infirmary, in which 189 beds are used for instruction purposes. Associated with many of these hospitals are research departments and departments especially equipped for the study and treatment of particular



HARVARD MEDICAL SCHOOL

diseases. In the administration building of Harvard Medical School, labeled *A* in the picture, are the Warren Museum, the dean's offices, the faculty room and the joint library of the medical school and the school of public health. Other libraries available to medical students are the famous Boston Medical Library at 8 the Fenway, the Lucien Howe Library of Ophthalmology, the George Burgess McGrath Library of Legal Medicine, the College Library in Cambridge and the Boston Public Library to students who are residents of Boston and to nonresidents who file a bond at the bursar's office.

In the announcement of Harvard Medical School for 1941-1942 an estimate shows that the average cost of the school year is \$1,275 for the last three years and \$1,450 for the first year, when, in addition to other expenses, a microscope must be bought. This estimate includes tuition, board and room, books, laboratory fees, medical and infirmary fees, laundry and incidentals. The dean's office endeavors to assist students in obtaining part time work during the college year without any charge. However, unless a student can meet the expenses of at least the first year in school it is recommended that he postpone his entrance. Only a limited amount of outside work can be done without being a tax on the student's health and scholarship.

Candidates for admission to the first year class must present satisfactory evidence that their college work and other credentials have been of such character as to give promise of work of high quality in the medical course. On this basis the school considers for admission graduates in arts or in sciences of colleges holding membership in one of the national educational associations. In exceptional cases, applicants without a degree who have completed two or more years of college work may be admitted provided they present certificates showing that they have a scholastic standing placing

them in the first third of their class. The entering class is limited to one hundred and twenty-five.

Harvard Medical School has available many scholarships and fellowships which may be granted to students under certain conditions and which will help them to pay at least a portion of their expenses. The school also offers to incoming members of the first year class two or three national scholarships which carry a stipend large enough, if necessary, to meet all the student's essential expenses; successful applicants who maintain a high honor record will continue to hold these scholarships through the medical course. Direct application for the national scholarships cannot be made, since all accepted first year students are considered as candidates, the awards being made without reference to financial circumstances.

Loan funds have been established to which students in need of financial assistance may apply for loans up to \$400 during any one year and to a total of \$1,000 during the course. The notes are payable two years after graduation, and 5 per cent interest is charged. Such loans are made only to students in the second, third and fourth year classes whose records have been sufficiently creditable to make it probable that they will remain in the school and whose other financial obligations do not make it improbable that this loan will be repaid.

The tutorial system at Harvard Medical School makes it possible for properly qualified students to do extracurricular work throughout their course. Students who because of previous training have a special interest in the medical sciences are encouraged to devote the spare time afforded by the two free afternoons to intensive work on a well defined problem. Not more than 15 per cent of the class is allowed this privilege, and their past records must show that their regular curricular work will not be impaired if they undertake such extracurricular studies.

Duke University

The students and faculty of Duke University School of Medicine, Durham, N. C., were addressed, December 10, by Dr. J. M. McIntosh, professor of public health, University of Glasgow, Scotland, on "The Medical Student in War Times"; January 14, by Mrs. Mary P. Diaz of Puerto Rico on "Occupational Therapy in Puerto Rico"; February 11, by Ralph Linton, professor of anthropology at Columbia University, New York, on "Culture in the Normal Personality," and, November 11, by Dr. Michael Heidelberger of Columbia University College of Physicians and Surgeons on "Recent Advances in the Knowledge of Complement and Its Function." At the beginning of the winter quarter the student body at Duke comprised two hundred and forty-seven students, including one hundred and eleven juniors and seniors.

Guest Students at Columbia from Latin-America

A group of forty-two Latin-American students are visiting Columbia University, New York, for a period of six weeks under the auspices of the Institute of International Education. Included in this group are thirteen recent graduates of medical schools. Arrangements have been made for them to take postgraduate courses and to work in the laboratories of hospitals affiliated with the university during the visit. A number of other Latin-American physicians, including a group of six who are visiting this country under the auspices of the Chilean Government, are also registered for postgraduate courses. An increasing amount of interest in American medical education has been shown by physicians from South America, and during the past year thirty have been registered for postgraduate courses under the faculty of medicine.

Yale Undergraduates on Hospital Duty

Seventy undergraduate students at Yale who intend later to study medicine have volunteered to spend five hours a week in the New Haven Hospital doing numerous humble tasks that will save the time of doctors and nurses, as for example carrying meals to patients, making beds, carrying water and preparing charts. The idea of the "Yale Aides" is said to have originated with Mr. John Heller of Wilton, Conn., a premedical student, now a senior at Yale. It is said that other eastern universities intend to adopt the plan.

Fraternity Activities at Northwestern

According to our Student Section correspondent, the fraternities at Northwestern University Medical School, Chicago, are rapidly adapting their programs to the present emergency. Nu Sigma Nu fraternity is conducting a blood bank donation on the part of the medical student body in support of the war effort. All the fraternities hold frequent informal gatherings at which members of the faculty discuss points of particular interest at this time. The Pi Kappa Epsilon honorary fraternity sponsors student medical society meetings. Nu Sigma Nu gives an annual prize of \$100 to the student elected as the outstanding member of the senior class. Five hundred persons attended the annual Ranson Lecture, January 30, given by Phi Beta Pi fraternity, at which the guest speaker was Dr. Russel L. Cecil of New York.

Course in Facial Restoration

Indiana University School of Dentistry, Bloomington, announces the establishment of a course to train dentists in artificial facial restoration in anticipation of increasing facial disfigurements because of the war.

Lectures in Honor of Deceased Faculty Members

A lectureship was recently established at the University of Texas Faculty of Medicine, Galveston, by the Alpha Nu chapter of the Phi Rho Sigma medical fraternity in honor of deceased members of the faculty. The first lectures were given on December 1 before the student body, the faculty and visiting civilian and army physicians by Drs. Rolla E. Dyer, chief of the division of infectious diseases, U. S. Public Health Service, Bethesda, Md., and Russell L. Cecil, New York, who discussed typhus fever and rheumatoid arthritis respectively.

College of Medical Evangelists

The students of the clinical division of the College of Medical Evangelists, Loma Linda, Calif., attended a cardiac clinic at the Los Angeles General Hospital, November 4, conducted by Dr. Paul D. White, Boston. The clinic was sponsored by the Los Angeles Heart Association and was part of the ninth annual symposium on cardiovascular disease.

Ground was broken, October 2, preparatory to the erection of a dormitory for men in the preclinical division of the College of Medical Evangelists. The dean, Dr. Edward H. Risley, was master of ceremonies. This building will complete the quadrangle on the campus of the medical school.

The Circle

The ceremony of presenting keys was held on Dec. 28, 1941 by the Circle, the honor scholastic society, Louisiana State University School of Medicine, New Orleans. The program was opened by Dr. B. I. Burns, dean of the medical school; he introduced the guest speaker, Dr. Edgar Hull, who spoke on the physician as a member of his community. Keys were then presented to the following students elected to the society: Rudolph J. Marshall Jr., Morris Ruchelman, Charles D. Muller Jr., Malter A. Salatch and George Degenshein, all seniors, and to Douglas Lindsey, Norman Burnstein and Dan Becham, members of the junior class. A key was also presented to the honorary member selected by the society, Dr. Urban Maes, and to the one selected as the outstanding alumna, Dr. Emma Moss.

History of a Medical Fraternity

A complete history of the Alpha Kappa Kappa medical fraternity is now running serially in the fraternity's official publication, the *Centaur*, and will be published in book form next summer. The author of the history is Dr. Lee D. Van Antwerp, Meriden, Conn., who is present editor of the *Centaur*.

Elisha Kent Kane Graduated from Pennsylvania

In the Student Section, January 24, page 330, Dr. Richard C. Holcomb, Captain, U. S. Navy, retired, stated that Elisha Kent Kane graduated in medicine from the University of Virginia. Dr. J. J. Horton, formerly past assistant surgeon in the U. S. Navy, writes that Dr. Kane graduated in medicine from the University of Pennsylvania in 1842 and gives as his authority the book "The Life of Dr. Elisha Kent Kane and other Explorers" by Samuel M. Sumner, A.M., Philadelphia: J. W. Bradley, 48 North Fourth Street, 1859. Dr. Kane spent a year and a half at the University of Virginia, where it seems he studied civil engineering. He had to return home on account of illness and when able to return to school he went to the University of Pennsylvania, where he completed the medical course of studies.

Book Notices

Climate and Man: 1941 Yearbook of Agriculture. United States Department of Agriculture. Cloth. Price, \$1.75. Pp. 1,248, with illustrations. Washington, D. C.: Supt. of Doc., Government Printing Office, 1941.

This is an excellently prepared, carefully edited presentation of the part climate has played in the colonization of new regions and of its influence over various aspects of agriculture in different areas. It consists of five parts and a sixty-six page introductory summary of the whole. Part 1, on climate as a world influence, contains an excellent chapter by Richard J. Russell on climatic change through the ages and two other chapters on the how and why of climatic and weather knowledge. Part 2, consisting of ten chapters on climate and agricultural settlement, deals with climatic influence in the settlement of various regions. Here are included inadequate chapters on comfort and disease in relation to climate and health in tropical climates; these might better have been omitted or their places taken by articles prepared by more competent writers. Part 3, consisting of seventeen chapters on climate and the farmer, covers the detailed relationships of climate to individual crops and agricultural activities; it contains an excellent chapter on climate and livestock production by A. O. Rhoad. Part 4, consisting of four chapters on the scientific approach to weather and climate, has a readable chapter on modern meteorology by C. G. Rossly and another on amateur forecasting from cloud formation, which may be useful in these war times when weather bureau forecasts are published for only a few hours in advance. Part 5 covers the last half of this large volume and contains climatic data, with special reference to agriculture in the United States. Although the volume is intended for readers primarily interested in agriculture, its broad scope and careful handling of subject matter make it useful also for others interested in climatic and weather effects acting more directly on man. For the increasing number of physicians who look on these environmental influences as important factors in human existence the volume is easily worth its small cost price. It is unfortunate that this otherwise fine work should have been so poorly handled in the parts dealing with climatic effects on human health and disease. In this respect its broad title is misleading. It is an exceedingly valuable reference work for physicians or others interested in agriculture. The book is well made, with clear readable type, and is free of the small errors so often overlooked.

American Newspaper Reporting of Science News. By Hillier Kriehbaum, Associate Professor of Industrial Journalism, Kansas State College of Agriculture and Applied Science, Manhattan. Kansas State College Bulletin Volume XXV, Number 5. Industrial Journalism Series 16. Paper. Pp. 73. Manhattan, 1941.

This is the first complete history ever compiled of the reporting of science news in American newspapers. It covers the period starting with the issuance of *Public Occurrences*, the first American newspaper, dated Sept. 25, 1690, through 1937. This first American newspaper, which died after a single issue, carried a story about the then prevailing "fevers" and a smallpox epidemic. As Kriehbaum points out, "These two stories might be cited as the first American newspaper reporting of science news. The paragraph simply stated the facts and made no effort to support any control measures." Another interesting fact about the scientific aspect of early American journalism is brought to light by Kriehbaum in his description of one of the first newspaper controversies in America. This concerned smallpox inoculation and took place between the *New England Courant* and the *Boston News-Letter* and the *Boston Gazette*. The *Courant* was printed by James Franklin, older brother of the more famous Benjamin.

From the prerevolutionary war developments in science writing in newspapers, Kriehbaum develops the history of science writing through the postrevolutionary period in American history, agricultural and medical coverage and early nineteenth century coverage into what he terms the "middle period in science reporting." Among the science stories enumerated by him that

occurred in the latter era are those regarding Samuel F. B. Morse's telegraph, the laying of the Atlantic cable, the telephone, Edison's electric light and the Wrights and aviation. In the third section of his paper Kriehbaum describes the developments in science reporting following the last world war. Chapter 4 is devoted to the history of Science Service, the organization founded by the late E. W. Scripps as a non-profit making organization for the dissemination of science news to the press. In his final chapter he describes the movement that led to the organization of the National Association of Science Writers. In his final chapter he tells of the meeting of science writers called by Dr. Morris Fishbein, editor of *THE JOURNAL*, in the headquarters of the Association in Chicago on Oct. 29, 1937. At this meeting the problems arising from the reporting of the advances in medicine and surgery were discussed by the science writers and others interested in popularizing science.

Although some milestones in the history of science reporting subsequent to that date are enumerated in Kriehbaum's paper, the story of the developments in this field that have occurred since the meeting called by Dr. Fishbein is far from complete. However, Kriehbaum does not claim to have brought the story of science news reporting up to date. So many significant developments in this field have taken place during the past four years that it is hoped that at some future time Kriehbaum will bring the story of science news reporting up to date in a supplementary paper. His present report is one that should be carefully studied by every one interested in health education as well as by those directly concerned with the dissemination of scientific news to the public. It represents a distinct contribution to a better understanding of this most important subject and should be placed in all medical, newspaper and schools of journalism libraries.

Blood Disorders in Children. By I. Newton Kugelmass, M.D., Ph.D., Sc.D. Spéc., Attending Pediatrician, Downtown Hospital and Pan-American Clinics, New York. Cloth. Price, \$10. Pp. 897, with illustrations. New York, Toronto & London: Oxford University Press, 1941.

This presentation of the blood and its abnormalities in children is different from any of the recent books on hematology. The material is divided into six sections: the hemopoietic system, diseases of the erythron (anemia, polycythemia), diseases of the leukon (including leukemia), diseases of the thrombon (purpura), diseases of the reticuloendothelium (lipoidoses) and diseases of the organism (systemic infections). The material is presented in a clearcut, dogmatic fashion, with elimination of controversial views and a minimum of bibliography. Each condition is described as it exists in the patient and not as some author's discoveries or views. This is the type of presentation that the medical student likes and the busy practitioner prefers, but it will no doubt irritate professional hematologists. It represents the crystallization of the views of one school of hematology. The author adopts what he considers is the correct view in many matters, such as the origin of the blood cells, although others may consider these points undecided. However, hematology is not yet in the stage where a difference of opinion necessarily means that a point of view is wrong. A useful feature is the presentation of summaries in the form of one hundred and twenty-five tables. As a whole the pictures are well chosen, and those showing technical procedures as applied to infants are excellent. There is a discrepancy in the amount of hemoglobin in infancy in the table on page 77 and the chart on page 83. The table of liver equivalents to parenteral preparations of liver extract may be open to criticism, as it is difficult to compare the potency of the intramuscular extracts with whole liver. Details of technic are given whenever any methods or tests are discussed. Valuable also is the section on blood changes in systemic and infectious diseases. A glossary and a section on symptom diagnosis (tabulated symptoms and diseases in which they occur) are given. Throughout the book appear synopses of the history of the subject. The book is intensely practical, unusual in its completeness, in the tremendous amount of material which it contains and in its clear method of presentation. It will no doubt be the standard work on disorders of the blood in children.

Tratamiento del paludismo Por Carlos Alberto Alvarado Tesis de doctorado, Universidad nacional de Buenos Aires Facultad de ciencias medicas Paper Pp 90, with 2 illustrations Buenos Aires Imprenta Mercatalli, 1941

Bronco-espiroquetosis de Castellani Su desarrollo en la Republica Argentina Por Jorge Enrique Machado Tesis de doctorado Universidad nacional de Buenos Aires Facultad de ciencias medicas, Escuela de medicina Paper Pp 52, with 9 illustrations Buenos Aires Libreria y editorial L. E. I. C. A. Nocito & Riano 1941

La lucha contra el cancer en la Republica Argentina Por el Dr Victor H Locatelli Tesis de doctorado, Universidad nacional de Buenos Aires Facultad de ciencias medicas Paper Pp 61 Buenos Aires Aniceto Lopez 1941

Lesiones traumáticas del astrágalo Por Jose Manuel del Sel Tesis de doctorado Universidad nacional de Buenos Aires Facultad de ciencias medicas Paper Pp 135 with 33 illustrations Buenos Aires Aniceto López 1941

La filactotransfusión en pediatria Por Vicente Jose Anello Tesis de doctorado Universidad nacional de Buenos Aires Facultad de ciencias medicas Paper Pp 55 with 9 illustrations Buenos Aires Imprenta de Alfredo Frascoll 1941

Neumoconiosis Estado actual del tema, silicosis pulmonar Por Santiago Juan Marchese Tesis de doctorado Universidad nacional de Buenos Aires Facultad de ciencias medicas Escuela de medicina Paper Pp 80 with 4 illustrations Buenos Aires A Guidi Buffarini 1939

Anestesia raquidea con percaína en cirugía ginecológica Por el Doctor Horacio L Mazza Tesis de doctorado Universidad nacional de Buenos Aires, Facultad de ciencias medicas Paper Pp 70 with illustrations Buenos Aires 1940

The seven chapters of the thesis of Carlos Alberto Alvarado cover malaria, industrial prevention of the disease by administration of drugs, control of malaria by supervision of malarial patients and carriers and antimalarial therapy. Jorge Enrique Machado discusses Castellani's bronchospirochetosis in Argentina. Two cases observed by the author in his clientele are reported. Several cases from the Argentine literature are briefly reviewed. Victor H Locatelli deals with the crusade against cancer as carried on in Argentina. Early diagnosis, biologic reactions and biopsy in diagnosis, precancer and the role of tobacco are discussed in detail. Jose Manuel del Sel discusses traumatic injuries of the astragalus, especially fractures. His book is the result of internist work in orthopedics at the Hospital Italiano, Hospital Durand and Clinica Valls of Buenos Aires. Vicente Jose Anello discusses phylactotransfusion in pediatrics with special reference to indications, selection and preparation of donors, preparation of patients and results. Seven cases of local or acute infection, septicemia from suppuration, pneumococcal meningitis and bronchopneumonia are reported. Horacio L Mazza discusses spinal anesthesia with nupercaine in gynecologic surgery, with especial reference to physiologic and anesthetic effects, advantages, original and modified techniques of Quarella and Iones and Villar's technic. A clinical study with statistics of hospital work on gynecologic surgery, in which the author resorted to nupercaine intraspinal anesthesia, is reported. Santiago Juan Marchese makes a general study of pneumoconiosis and pulmonary silicosis. He reviews the modern conceptions on the pathogenesis and the mechanism of development of the diseases, their relations to pulmonary tuberculosis and cancer, clinical and roentgen aspects, prevention and therapy. A clinical and roentgen study of 4 cases is reported.

The Microscope By Simon Henry Gage Seventeenth edition Cloth Price \$4 Pp 617, with 313 illustrations Ithaca Comstock Publishing Company, Inc 1941

The previous edition of this book was reviewed in THE JOURNAL more than five years ago. The present edition is much the same in general arrangement, although some changes have been made in the text and the illustrations in every chapter in order to make the subject more readily understood. Brief attention is given to the electron microscope, with which it is believed magnifications as high as 100,000 diameters can be attained. This newly invented microscope uses electronic waves which are a hundred thousandth of the wavelength of visible light, and as they are invisible their image must be made visible by means of either a fluorescent screen or a photographic plate. The electron microscope is to be compared with a projection microscope in which the image formed is entirely independent of the eye. It is not like the microscope into which one looks and with which the final image is formed on the retina of the eye.

The electron microscope at present is not available for ordinary biologic study, but there are already certain uses for which it is adapted. This edition also calls attention to a substance known as polaroid, which may be used instead of Nicol prism for the polarizer and is considerably cheaper. Polaroid is composed of a multitude of fine, elongated crystals embedded in a cellulose matrix, which is usually mounted between thin plates of glass or heavy film. Mention is also made of new plastics for mounting specimens in place of Canada balsam. There are chapters on spectroscopy, the polarizing microscope, the dark field microscope and the bright field microscope. The book seems to cover completely the physical side of microscopy. This edition is printed on whiter paper than was its predecessor, and that improves its appearance and readability.

Body Mechanics in Health and Disease By Joel E Goldthwait MD FACS, LL.D., Lloyd T Brown MD FACS, Loring T Swalm MD and John G Kuhns MD, FACS With a chapter on the Heart and Circulation as Related to Body Mechanics By William J Kerr MD FACP Third edition Cloth Price \$5 Pp 316 with 121 illustrations Philadelphia Montreal & London I B Lippincott Company 1941

This book is the cumulative material from a group of Boston workers who have been recognized throughout the world as the nucleus of the pioneers in this field. The book contains their latest views and should be read by every orthopedic surgeon, physical therapist and pediatrician. There is in addition an instructive chapter on the heart and circulation as related to body mechanics by W J Kerr of California. Several interesting features include the schematic representation of the postural syndrome resulting from obesity, the Kerr-Lagen belt and the effect on body mechanics of rigid and soft mattresses. Since the first edition of this book was published the fundamental principles described in the study of patients suffering from chronic diseases have become increasingly important. For this reason the authors have changed the title to Body Mechanics in Health and Disease. In the earlier editions emphasis was placed on chronic diseases associated with the faulty mechanics of the body. As their study has progressed, however, it has become apparent that, while this is essential, the most significant part of the work has to do with prevention. More emphasis has been placed on the maintenance of physical fitness and health. Greater attention should be given to the prevention of many deformities which have had faulty body mechanics as their underlying cause. For this reason a chapter on developmental deformities has been added. A number of the chapters have been wholly rewritten in order to include newer knowledge of the application of these principles to systems of the body or to special diseases.

The Chemistry and Manufacture of Cosmetics By Watson G de Navarre Special Instructor in Cosmetics College of Pharmacy Wayne University, Detroit With a chapter on the Federal Food Drug and Cosmetic Act of 1938 as It Relates to Cosmetics By Ralph J Hill DSc LLB Member of the Faculty of the College of Pharmacy Wayne University With a foreword by Roland T Lakey, Dean College of Pharmacy Wayne University Cloth Price \$8 Pp 745 with 179 illustrations New York D Van Nostrand Company Inc 1941

The title of this book is dealt with so extensively and from so many different angles that the reviewer is tempted simply to reproduce a quotation in the foreword: "Tis better that a man's own works, than another man's words should praise him." A listing of the chapter headings would serve to indicate the vast number of subjects and the phases of the cosmetic industry which are dealt with. The usual information that one would expect to find, such as the chemical nature of various cosmetics as well as a practical discussion of the factors that enter into their formulation is detailed. In addition one finds such material as metrology and alligation, a section dealing with equipment for a small cosmetic manufactory, even including a discussion of fire fighting, summaries of inorganic, organic and colloidal chemistry and a consideration of preservatives, antioxidants, emulsifiers, absorption bases, wetting agents and other classes of preparations used in the industry. A list of incompatibilities of various ingredients is useful. A discussion of colors and their certification, as well as extensive consideration of the provisions of the Federal Food, Drug and Cosmetic Act dealing with cosmetics, is included. There are chapters dealing with the physiology of the skin, hair and scalp and extensive

discussion of all types of cosmetic preparations, including even dentifrices. The author expresses his indebtedness to the literature of the cosmetic industry, and judging from the text and the bibliography it can only be presumed that he is familiar with much of it. There are many detailed descriptions of the tests used in determining the adequacy and stability of various cosmetics. Packaging and labeling (in accordance with federal legislation) are dealt with in connection with the discussion of the various classes of preparations. Sections dealing with items in a certain class contain abstracts of patents—American, British, German, French and others—issued on products and processes used in their preparation. The author states that the book is not intended as a formulary and yet admits that most of the formulas in it have been successfully manufactured in commercial quantities according to the methods described in this book. While the volume deals primarily with the technic and practices of cosmetic manufacture, the information in it should be familiar to those in all branches of the cosmetic industry.

Pills and Proverbs. By Charles H. McCollum, M.D., F.A.C.S. Cloth. Price, \$2. Pp. 225, with 9 illustrations. Boston: Meador Publishing Company, 1941.

Angina pectoris forced the author to take life more slowly, and in the extra time he has written a book which is essentially autobiographic, although woven chiefly about his parents, his birth and early environment. He was born in poverty in Tennessee, where he learned sturdy traits of character. He learned the value of discipline in Texas while working in a drug store. While yet a medical student he volunteered as a soldier in the Spanish-American War and at Chickamauga Park helped care for numerous patients with typhoid. After finishing medical school he practiced in a small Texas town, then moved to a larger city, where, after having failed to make a go of two partnerships, he started over alone. Eventually he built a small hospital. Later his son joined him in practice. Many incidents in a long career are reviewed. Dr. W. B. Russ of San Antonio writes in the foreword that all great men in medicine since the days of Hippocrates have been at heart country doctors, even though they became great scientists and lived in cities, the "graveyards of civilization to which humanity from the countryside and villages comes to die morally and spiritually in an atmosphere that glorifies the flesh." Dr. Russ commends this book to "a confused, morally and spiritually ailing generation facing a crisis made inevitable by the softening and deteriorating influences of communism and socialism, . . . a generation that now is called upon to pay the penalty for our social and biologic sins."

Community Hygiene. By Dean Franklin Smiley, A.B., M.D., Professor of Hygiene and University Health Officer in Cornell University, New York, and Adrian Gordon Gould, Ph.D., M.D., Assistant Professor of Hygiene and Attending Physician in Cornell University. Third edition. Cloth. Price, \$2.50. Pp. 448, with 120 illustrations. New York: Macmillan Company, 1941.

This edition of a widely used standard textbook on community hygiene has been extensively revised and rewritten. It opens with an introductory review of how community hygiene has developed from primitive, ancient ideas of sanitation to the modern era. This chapter includes an evaluation of the relative importance of different phases of public health work. Section II is devoted to environmental health hazards and their control, with a chapter on "man the commonest source of infection for man" plus chapters on animals as sources of infection for man, insects, weather and outdoor air, indoor air and ventilation, sanitary significance of soil and the relationship of water to disease. Further chapters in this section deal with the provision of sanitary water supply with housing and health, food and health and occupational health hazards. Section III deals with the community attack on specific diseases and disorders. Significant of the modern trend is the fact that the reading chapter in this section has to do with mental hygiene and is followed by the chapter on sex hygiene. Not until then do we find chapters on tuberculosis, heart disease and cancer. Section IV touches on health problems specific to certain groups, such as maternal and child health problems and those involved in infant health, school health and industrial health. Military health problems and the health of the rural population form the topics

for chapters in this section. Section V deals with doctors, nurses and hospitals, the drug industry, voluntary and official public health agencies and the future of our health agencies and activities. The authors manifest again a broad grasp of public health problems and their relationship to private medical practice. Up to date and modern as it is, this edition should enhance the reputation for usefulness achieved by previous editions. Particularly notable is the improvement in illustrations. The excellent bibliography is not the least of the valuable features in the book. There is also an adequate index.

Administrative Medicine. Haven Emerson, A.M., M.D., Editor. Loose-Leaf. Fabrikoid. Price, \$7.50. Pp. 839, with illustrations. New York & Edinburgh: Thomas Nelson & Sons, 1941.

This loose leaf volume is similar to the loose leaf systems of medicine and surgery and the loose leaf encyclopedia issued by the same publishers. Edited by Dr. Haven Emerson, it reflects his long experience and broad grasp of public health problems and his appreciation of the importance of individual initiative in the private practice of medicine, dentistry and hospital management. The fifty-six contributors are well qualified to write on the subjects assigned. The authors include some who are well known for writings advocating systems of medical practice which are looked on with disfavor by the medical profession, but their presentations are temperate and represent valuable information as to points of view and movements which every physician engaged in administrative duties should possess.

This is a comprehensive survey of the field drawn from many sources and representing all shades of opinion, including some differences and apparent inconsistencies when several authors approach the same subject. It should be a useful reference book, a necessity for every physician engaged in any phase of administrative medicine and important for the private practitioner, whose practice touches on or is touched by one or more of the numerous and growing activities in organized public health and public medical care in the United States.

Weight Reduction: Diet and Dishes. By E. E. Claxton, M.B., B.S., D.T.M. & H. With Tables and Recipes Suitable for Diabetics. Recipes by Lucy Burdekin. Second edition. Cloth. Price, 8s. 6d. Pp. 201, with one illustration. London: William Heinemann, Ltd., 1941.

The second edition of this book within four years has been revised and some newer material added, including a table of alcoholic beverages and a short war appendix. The material is written in an entertaining style and is presented in simple, non-technical language. Some of the foods are limited to the British groups (Allenby's Food, Benger's Food, Bourn-Vita). In part II, 104 pages of detailed recipes are given. The book should be extremely helpful to the intelligent layman seeking to understand his diet, but it is not without interest to the physician. No bibliography is given.

Emergency Medical Services Instructions. Part I: Medical Treatment and Special Centres. Ministry of Health. Paper. Price, 30 cents; 1s. 2d. Pp. 60. New York: British Library of Information; London: His Majesty's Stationery Office, 1941.

This is an official document from the British Ministry of Health, planned to be of aid to physicians charged with emergency medical service in Great Britain. It has been worked out in great detail by a competent group of scientific advisers and provides a great deal of material as to the location of the advisers and the various agencies through which emergency medical service is administered.

Our Sex Life: A Guide & Counsellor for Everyone. By Fritz Kahn, M.D. Translated from the German by George Rosen, M.D. Second edition. Cloth. Price, \$5.75. Pp. 439, with 41 illustrations. New York: Alfred A. Knopf, 1942.

This is the second revised edition of a book published in this country in 1939. It is a direct, succinct statement covering the sexual functions, hygiene, fertility, abnormalities, diseases, prostitution, and the sex life of the unmarried.

I'm Gonna Be a Father! By Bob Dunn (with a Little Assistance from His Wife). Boards. Price, \$1. No pagination. Philadelphia: David McKay Company, 1941.

This is a book consisting largely of cartoons with captions presumably intended for prospective male parents. Some of it is quite funny; none of it is worth the price charged.

Queries and Minor Notes

THE ANSWERS HERE PUBLISHED HAVE BEEN PREPARED BY COMPETENT AUTHORITIES. THEY DO NOT, HOWEVER, REPRESENT THE OPINIONS OF ANY OFFICIAL BODIES UNLESS SPECIFICALLY STATED IN THE REPLY. ANONYMOUS COMMUNICATIONS AND QUERIES ON POSTAL CARDS WILL NOT BE NOTICED. EVERY LETTER MUST CONTAIN THE WRITER'S NAME AND ADDRESS, BUT THESE WILL BE OMITTED ON REQUEST.

VITAMINS AND ULTRAVIOLET LAMP AS SUBSTITUTE FOR SUNSHINE

To the Editor:—The flood of ink used to print data concerning vitamins is becoming a torrent, and the claims made for these chemicals are often fantastic. Will you give me some advice based on scientific facts in answer to the following questions? A young man is working in an industrial establishment seven days a week. There is no sunshine whatever in the building owing to the necessity of war blackout. He takes his meals in an artificially lighted basement and does not leave work until after sundown. The employer advises the regular consumption of a vitamin preparation and the use of a sunlamp at home after work. Is either procedure advisable without competent supervision? If so, what vitamin do you suggest and in what dosage, and what ultraviolet sunlamps are effective in taking the place of sunlight as normally found on the West Coast?

M.D., California.

ANSWER.—Any employer who requires the services of employees on a seven day week basis assumes responsibilities in excess of the mere recommendation of the home use of ultraviolet lamps and shotgun vitamin preparations. The questions raised are far from superficial, and their import is greater than may be covered in the space limitations of this department. While emergency conditions may prompt the operations of machinery twenty-four hours daily and for seven days a week, present exigencies do not demand that the very same personnel perform duties on the same shift for every day in the week and over extended periods of weeks or months. Through the operation of swing and staggered shifts, plants may be operated continuously without the imposition of physical burdens on any group of workers. The lure of pay and a half and double pay for overtime is tempting fairly large numbers of workers to volunteer for prolonged hours of services. Fifteen hours daily, though not regular, are not exceptional. In some instances swing shifts that provide for a five day week but including Saturdays and Sundays have led to some demands for excess pay in the absence of excess work periods. "Hogging the pay roll" is a popular emergency product at the very time when some hundreds of thousands of other workers caught without any employment in the snail pace shift to military production are demanding double benefits from unemployment insurance funds. Granting the laudability of much overtime work within reason and anticipating more to come, insults to work physiology and human limitations may not be met solely by a vitamin pill and a sunlamp of uncertain capacity. Only the disingenuous believe that even in an emergency will a sustained work week of seventy hours lead to an output greater than for forty-eight hours. Given a weekly task within physiologic limits and with assignment to staggered shifts, together with proper diet and personal habits, the need for artificial safeguards may disappear. Excess work hours are especially undesirable in jobs involving health exposures. Owing to augmented lung ventilation resulting from fatigue, in two over-hours the intake of toxic materials may exceed the entire preceding eight. In the instance of exposure to lead dust, one additional work hour may be the determining factor with regard to lead poisoning.

Military needs may lead to excess physiologic taxation of workers in which benefits may be anticipated from such measures as artificial irradiation and supplemental vitamins, but it does not follow that work in a windowless building at once indicates a need for vitamin D, the sunlight vitamin. The need for supplemental B₁ might be greater. For the purposes of this reply, no warrant is accepted for specifying precise types of either vitamins or lamps as short circuits around work physiology. If this attempt is to be made at all, it should be accorded the benefit of medical supervision.

RENAL CONCENTRATION TEST WITH SOLUTION OF POSTERIOR PITUITARY

To the Editor:—Please furnish me with some details on the new concentration tests using solution of posterior pituitary. Would this be safe for a patient who has hypertension due to some renal pathologic condition?

Benjamin Miller, M.D., Baltimore.

ANSWER.—The renal concentration test using solution of posterior pituitary (Sodeman, W. A., and Engelhardt, H. T.: *Proc. Soc. Exper. Biol. & Med.*, 46:688 [April] 1941) is being developed to obtain a procedure requiring no preparation of the

patient. Such a procedure is useful in office practice and when cooperation of the patient is in doubt. As described it consists in the subcutaneous injection into an unprepared patient of 10 units of solution of posterior pituitary (1 cc. obstetric or 0.5 cc. surgical). Specimens are collected at half-hourly intervals for two hours and the specific gravity is determined. Small volumes of urine require a Saxe urinopycnometer or weighing bottle for estimation of the specific gravity. In a technic now being developed by Sodeman and Engelhardt, hourly collections for three specimens appear to be as satisfactory and require only the usual small urinometer. In normal persons the specific gravity reaches 1.024 or more in one specimen, at times exceeding 1.032. Corrections for temperature and albumin should be made when necessary as in other concentration tests. It is to be emphasized that in the same normal subject the different concentration tests will give various values for specific gravity, depending on the degree of inhibition of water diuresis by the varying periods of water restriction. In normal subjects higher values may be obtained at times by prolonged periods of water deprivation than with solution of posterior pituitary. Under similar conditions with periods of water restriction up to sixteen to eighteen hours this has not been the case. No claim is made that the procedure gives a "ceiling" specific gravity but that the standards set up for normal subjects are workable ones with a lower limit of approximately 1.024. Similar results have been obtained in South America (Pasqualini, R. Q., and Etala, E.: *Rev. Soc. argent. de biol.*, 16:161, 1940). With impaired renal function the values closely parallel those obtained by water deprivation.

Contraindications to the test include pregnancy, coronary pain and marked oliguria. Hypertension is not a contraindication. Little or no effect has been noted on the blood pressure with the dosage used, even in the presence of uremia. This is a relatively recently developed test and should probably not be employed without previous consideration of the standard methods.

PARTIAL POSITIVE SEROLOGIC TESTS FOR SYPHILIS

To the Editor:—An unmarried woman aged 20 had given her blood for transfusion in her mother's case about one year before I saw her. At that time the Kline reaction was negative. On a routine check-up it was found that she had a 2 plus Wassermann reaction. The blood has been checked in three laboratories and they report 2 plus Kahn, 2 plus Rytz, 2 plus Kline and 2 plus Wassermann reactions. Her heterophile antibody determination is negative. She states that she has not had any sexual contact and she has never manifested any of the signs or symptoms of primary or secondary syphilis. I have waited two months and have rechecked her blood but still find a 2 plus Wassermann reaction. I also have rechecked her mother's blood, which is negative. I have hesitated to treat her. What is your advice?

M.D., Wisconsin.

ANSWER.—It is impossible to decide from the description of the case whether or not this young woman has syphilis. The fact that she gives partial positive serologic tests for syphilis and a negative heterophile antibody determination, the former confirmed by three different laboratories, establishes a presumption that the patient has some form of the disease. The significance of the serologic test must be checked against a thoroughgoing physical examination conducted by some one completely familiar with the signs and stigmas of congenital syphilis. It is not sufficient in eliminating such a possibility to obtain a negative blood serologic test on the mother. Inquiry should be made, furthermore, into the physical and serologic status of the father, if living, and of siblings if there are such. Not infrequently it is helpful to correspond or to get in contact with a physician who attended the mother on the occasion of this young woman's birth or who is familiar with the family history.

For the checking of the serologic test as such, the determination of the titer of syphilitic reagin and the performance of a Kahn verification test would be useful. After these tests have been performed it would be permissible to watch the effect of four successive weekly injections of bismuth subsalicylate intramuscularly, serologic tests being performed at the time of each injection and for two or three weeks after the fourth injection. This is a species of provocative test, not too reliable, to be sure, but sometimes helpful in evaluating a doubtful case. An arsenical provocative procedure is not recommended, because of the strong nonspecific element.

It is well to have a competent ophthalmologist examine the periphery of the patient's ocular fundi for signs of old choroiditis (chicken track pigmentation), and a slit lamp examination of the cornea may establish remnants of vascularization indicative of a low grade and perhaps even relatively asymptomatic interstitial keratitis. It is to be understood that the examination of the patient will exclude as far as possible any

evidence of other diseases responsible for biologic false positive serologic tests for syphilis such as malaria, lepra or subacute bacterial endocarditis.

A denial of sexual contact has no value in eliminating syphilis from the diagnosis. This is also true of inability to give a history of any lesion of early syphilis, especially in the woman. The range of contacts capable of transmitting the disease is such that sexual intercourse is by no means a necessity.

The question as to whether or not this patient should be treated on the serologic findings as described is a difficult one to answer. This is a young and presumably nubile woman, capable of transmitting the disease to children, and, even though a reasonable presumption of nonspecificity can be established for the serologic test, the physician cannot escape a feeling of anxiety and uncertainty, if this patient should subsequently marry or become pregnant. In the event of a pregnancy, one might well be justified in insisting on at least minimal treatment for the protection of the child. On the other hand, it is bad syphilologic practice to institute treatment for the disease in the absence of a positive diagnosis. Once such treatment is instituted, it should be clearly understood both by physician and by patient that it must be carried through to a minimum reasonable standard for the treatment of an actual syphilitic infection. In other words, the patient must react to the situation as if a syphilitic infection had been definitely established and go through with adequate treatment for it. It is this principle which makes for a very proper hesitation in instituting treatment without confirmed diagnosis.

The examination of the spinal fluid in a case of this sort should be conducted when the serologic tests have been confirmed. A spinal fluid examination would now be in order before treatment is instituted. The probabilities are that the test will be negative, but it should nonetheless be performed and all four conventional tests, namely quantitative complement fixation, cell count, globulin estimation and colloidal test, should be reported by the laboratory examining the fluid.

The discrepancy between the negative Kline, which is a sensitive test, at the time of the blood transfusion and the serologic test at the present time is of course disturbing, but such a discrepancy can occur in congenital infections, and it is of course entirely possible in an acquired infection. One would expect, however, had the infection been acquired in the interval between the first and the second examination that the later serologic tests would be strongly and indubitably, rather than partially, positive.

ARSENICALS FOR CARDIOVASCULAR SYPHILIS

To the Editor:—A married man aged 36 suddenly died in bed following a "minute of gasping for breath," as described by his wife. He had been under my care for syphilis with cardiac involvement. He had a definite aortic regurgitation, moderate right and left ventricular enlargement, but no visible aneurysmal dilatation of the aorta as determined fluoroscopically. I saw him one year ago when he had cardiac failure, with pretibial and ankle edema, fluid (a moderate amount) in both lungs and three fingers' enlargement of the liver. His blood serologic tests were strongly positive on Wassermann, Kahn, Kline and Kolmer tests. He stated that he had previously received "shots" for syphilis by two different physicians in the preceding three years and was pronounced "cured" after from three to six months of treatment by each physician. He responded satisfactorily to digitalis therapy and bed rest after one month and was then permitted to resume his work as an office manager. I placed him then on six months' therapy with bismuth and mercury intramuscular injections every five days, using only Council accepted preparations. He felt perfectly well and at the end of six months his serologic tests were reported as 2 plus on the Boerner-Lukens-Wassermann test. I then gave him cautiously a series of neoarsphenamine intravenous injections every five days, beginning with a dose of 0.1 Gm. for one week and increasing 0.1 Gm. weekly until 0.6 Gm. was reached, as the patient was a robust, powerful ex-football player. No reactions were encountered. He received ten weeks of neoarsphenamine therapy and was changed over to three months of bismuth injections and then given ten weeks again of neoarsphenamine, whereupon he died suddenly. Throughout this time I gave the patient 15 minims (1 cc.) of tincture of potassium iodide thrice daily and 1½ grains (0.1 Gm.) of digitalis leaf daily (1 cat unit). Was neoarsphenamine contraindicated in this case despite the therapeutic precautions observed? What was the cause of death, which occurred suddenly, in "one minute," as the patient's wife stated? Was the therapy in this case incorrect or too vigorous in your opinion?

M.D., Pennsylvania.

ANSWER.—There are two schools of thought on the advisability of using one of the arsenical preparations in treating a patient with cardiovascular syphilis: (a) those who object to them and (b) those who advise an arsenical in small doses after adequate preparation with bismuth or mercury compounds. The results of treatment with either method are discouraging. Even though the patient in question was given adequate preparation with a bismuth compound the doses of neoarsphenamine given to him were larger than usually recommended. The maximum dose for such patients should not exceed 0.2 Gm. of

neoarsphenamine, and in fact the various arsenical preparations made for intramuscular use are highly recommended in such cases. Either bismarsen or sulfarsphenamine, one-fourth or one-sixth the usual dose, has many advocates.

Those who oppose the use of an arsenical in the treatment of patients with syphilitic aortic regurgitation would cite this case as an example of why an arsphenamine should not be used, as the advocates of this concept believe that the injudicious use of such an arsenical precipitates such accidents. It must be admitted, however, that sudden heart failure likewise occurs in patients with aortic regurgitation who have not had arsenic or heavy metal therapy. In view of the fact that this patient had been under antisyphilitic treatment for almost a year prior to his death, it might be assumed that he died from either coronary insufficiency or a profound disturbance in cardiac rhythm, in view of the absence of evidence of an aneurysm. The amount of neoarsphenamine given was much greater than is recommended in the treatment of cardiovascular syphilis.

PHOTOSENSITIZATION FROM PETROLEUM PRODUCTS

To the Editor:—A local oil storage plant has a problem in cleaning out the tanks after certain heavy oils have been stored in them. The method used is to heat the oil with steam, after which the oil is flushed out with water hoses; occasionally the worker has to go in to keep the drains clear when they clog. After exposure to the fumes, there are no ill effects until the patient gets into the sunlight—then almost immediately an allergic reaction takes place with swelling, redness and a feeling of heat in the affected part. Only the parts exposed to the sun are affected. After several days the skin peels and there is complete retrogression of the condition. As far as I know, the material is a mixture of creosote, lube oil and fuel oil. A shirt or mask does not protect, as the fumes seep inside. Working at night has been tried, but the reaction still takes place as soon as sunlight is encountered. To what is this condition due? How can effective prophylactic measures be taken? What is the best method of treatment?

M.D., New Jersey.

ANSWER.—The problem is clearly photosensitization by coal tar and petroleum products.

Photosensitization from coal tar derivatives is well known and has been described by Foerster and Schwartz (*Industrial Dermatitis and Melanosis Due to Photosensitization, Arch. Dermat. & Syph.* 39:55 [Jan.] 1939) and by Schwartz and Tulipan, (*A Text-Book of Occupational Diseases of the Skin, Philadelphia, Lea & Febiger, 1939, pp. 172-180*). The creosote in the mixture described is a coal tar derivative and a photosensitizer. Creosote oil is known to cause photosensitization among workers using it for impregnating wood used for sleepers, telegraph poles and piling.

Photosensitization from petroleum oil products is not so well known, but it does occur. Some crude oils, especially those with asphaltic bases, have natural photosensitizing properties, but nearly all "dye oils" (a cracked kerosene extract used for coloring lubricating oils) are photosensitizers. When the high boiling petroleum hydrocarbons are heated in the "cracking process" to form gasoline, many complex cyclic hydrocarbons are formed and these are left in the remaining red dye oil. Some of these cyclic hydrocarbons are similar to the photosensitizers formed when coal is destructively distilled to form coal tar. So the "lube" oil and the fuel oil in the tanks which the patients clean may also contain photosensitizers.

The methods for the prevention of this condition consist in wearing clothing impervious to fumes while cleaning the tanks. They may be of rubber, oiled fabric, or the new synthetic resins pliofilm, vinylite or koroseal, described in an article entitled "Clothing for Protection Against Occupational Skin Irritants," by Louis Schwartz (*Pub. Health Rep.* 55:1158 [June 28] 1940).

On the face, the place most frequently affected, a protective sun screen ointment can be applied before one enters the tanks. This protective ointment can consist of hydrous wool fat 70 parts, castor oil 28 parts and duponol 2 parts for a base. With this base is mixed 5 per cent of a chemical light screen, such as methyl salicylate, quinine oleate, methyl anthranilate or cycloform, and 5 per cent of a physical light screen, such as zinc oxide or titanium oxide.

The Doak Company of Cleveland sells a protective ointment containing the sun screens quinine oleate and titanium oxide; the West Disinfecting Company of Long Island City, N. Y., sells one containing methyl salicylate and titanium dioxide.

After the workers come out of the tank they should take off their work clothes and underclothes, take a cleansing shower bath and put on fresh underclothes and then regular street clothes. Before going out they can make a thin application of the sun screen ointment to the face.

The treatment consists in the application of sun screen ointments.

HYPERTRICHOSIS IN INFANTS AND CHILDREN

To the Editor—A girl aged 5 months started having excessive, fairly long black hair grow on her back and arms and scattered on the legs and pubic region. She was taken to a pediatrician when the hair was noticed. Intravenous pyelograms showed that the adrenal glands were normal. Roentgenograms of the pituitary region showed that it was normal. The baby is now a year old and apparently normal in every other way. If this is a glandular disturbance would there not be other symptoms? Could heredity be an influencing factor in one so young, and what can be done to inhibit the growth of hair?

G. C. Bates, M.D., Independence, Kan.

ANSWER—Hypertrichosis in children has been known to occur before other symptoms of endocrine disturbance. There are no doubt cases such as the one described in which no definite endocrine diagnosis can be made because of paucity of symptoms and therefore the cases have not been recorded in the literature. Heredity is often responsible for hirsuties in babies, but in these there is usually superfluous hair present at birth. It is often associated with spina bifida. Thus the patient of Bronstein and Baratz (Hypothyroidism and Cretinism in Childhood. V. Enlargement of the Heart with Hirsuties [Myxedema Heart], *Am J Dis Child* 52:128 [July] 1936) was a cretin with superfluous hair, contrary to the rule that hypothyroidism is accompanied by coarse, dry and sparse hair. In this case the superabundant hair was present at birth, which explains why the condition was not benefited by the treatment with thyroid.

When babies are afflicted with acquired hypertrichosis the condition is most commonly due to disease or tumor of the adrenal cortex or of the pituitary gland or both. Rare cases of hypertrichosis have been ascribed to disease of the pineal gland or even to status lymphaticus, although the thymus, when persistent, is usually held to be inhibitory to the development of secondary sex characteristics (Cooper, Zola K. The Relation of the Endocrine Glands to the Growth and Distribution of Hair. A Review of the Literature, *Arch Dermat & Syph* 21:1007 [June] 1930). Niles has written a good article on the role of the adrenal gland in hypertrichosis (Relation of the Adrenal Gland to Hypertrichosis, *ibid* 32:580 [Oct] 1938).

There is no practical local method of the removal of superfluous hair in babies. The only course is to watch the child closely for the appearance of other symptoms that may settle the diagnosis and suggest a method of treatment of the basic disorder.

PLUS MINUS SEROLOGIC REACTION IN INFANT HEADACHES AFTER MAPHARSEN

To the Editor—About five months ago on a routine test a primipara four months pregnant was found to have 4 plus Wassermann and Kahn reactions. There were no physical signs of the disease present nor any history of infection, but the presumption was that it was of over five years' duration. She is 32, has been married five years, and is a nurse. She states that she has not been exposed, her husband is negative to tests and for history. She was immediately started on treatment and prior to delivery in December she had received eighteen injections of bismuth subsalicylate and twenty-seven doses of mapharsen. Her pregnancy and delivery were uneventful and occurred at full term with a normal child, the latter was tested at two months and the reactions were entirely negative except that the cholesterinized antigen was reported as plus minus. The child has progressed well without any signs of syphilis. Is it necessary to recheck the child, and, if so, when would be the optimum time? With the last ten injections of mapharsen she has complained of violent headache occurring immediately after injection and lasting for most of the day. What is the significance of this in the presence of normal spinal fluid tests? Her serologic reaction has been unchanged since the last test taken just prior to delivery. To date she has received forty-seven injections of 0.006 Gm doses of mapharsen and forty-two of bismuth subsalicylate of 0.5 cc. I am particularly interested in an explanation of the headaches and criticism of the treatment to date and suggestions for any changes. She is now receiving courses of bismuth in twelve to fifteen doses weekly, alternating with courses of mapharsen of eight to ten doses. M.D., New York.

ANSWER—The child should have had repeated serologic tests done at weekly intervals when the plus minus reaction was reported when it was 2 months old. It is not advisable under such circumstances to await the developments of clinical signs of the disease before repeating a serologic test. The blood should now be examined immediately and, if the reports are negative, subsequent tests at two month intervals should be made until the child is 2 years old. If the tests are negative further rechecks will probably not be necessary, certainly not more often than once a year. If the reports are positive, treatment should be started at once.

The headaches the mother is having after each mapharsen injection are a definite indication to stop the arsenical therapy. It may be that a mild hemorrhagic encephalitis causes the headache, but in any event further arsenical therapy is not indicated. The mother's treatment may now be limited to bismuth alone, but instead of 0.5 cc of bismuth subsalicylate weekly it is suggested that she be given 2 cc every five days for a series of twenty injections twice a year for the coming two years.

EXERCISES FOR ATAXIA—MARRIAGE IN FRIEDREICH'S ATAXIA

To the Editor—Where can I obtain either a book or literature concerning Frenkel's exercises, to be used in cases of ataxia? Is Friedrich's ataxia hereditary? Would it be safe to tell two young persons, a brother and a sister, both of whom have been diagnosed by various neurologists as having Friedrich's ataxia, that it would be wise for them to marry?

J. P. Cogley, M.D., Council Bluffs Iowa

ANSWER—The book by H. S. Frenkel was first published in Leipzig in 1900. An English translation was issued by Blakiston of Philadelphia in 1902, by Rebman of London and New York in 1905 and by Heinemann, the second English edition London, in 1917. There was also a French edition in Paris in 1907. Some or all of these editions should be in the larger medical libraries and available for borrowing.

Friedrich's ataxia is one of the most hereditary of all nervous diseases. The chance of transmitting the disease to offspring depends entirely on whether or not the condition is dominant or recessive in the family pedigree or whether the pedigree shows a more complex method of inheritance with sparing of one or more successive generations. In the first instance, in which the disease is dominant or recessive on a simple mendelian basis, it would be transmitted to the next generation in at least a proportion of three to one. If the disease has progressed by more complex dimerous methods of inheritance the prognosis would be more difficult to assess, but at least one out of three of the offspring would probably have the disease, and the others would be capable of transmitting it into the third generation.

The inheritance, therefore, of the disease by the two persons in question should be plotted out in a pedigree form. In 1 case the prognosis would be easily assessed, if the condition is transmitted as a dominant, a large percentage of the offspring would have the disease in clinical form.

USE OF PRESSURE COOKER FOR STERILIZING

To the Editor—Can a pressure cooker be used for sterilizing and, if so how?
M.D., Wisconsin

ANSWER—A pressure cooker is in fact a small autoclave and will serve exactly the same purposes if used in the same manner and with the same precautions. The usual time and pressure used for sterilization are twenty to thirty minutes at a steam pressure of 15 pounds. It is important that all the air be allowed to escape before the air vent is closed and the steam pressure rises. Most pressure cookers are provided with a graduated pressure gage, but some of the smaller ones have a weighted gage which also serves as a safety valve and is not graduated in pounds. The regular graduated gage is more desirable if the cooker is to be used for sterilizing.

Since pressure cookers are not equipped for drawing a vacuum at the conclusion of sterilization, bandages and wrappings will be slightly moist when the cooker is opened and should be immediately dried by moderate heating in an oven.

VAGINAL TAMPONS

To the Editor—Is the use of vaginal tampons recommended for women of all ages, particularly girls of high school age?

Arthur E. Wade, M.D., Seattle

ANSWER—Some gynecologists believe that such tampons may do harm by damming back the blood and by irritating the vaginal mucosa. An occasional physician, on the other hand, maintains that these tampons are helpful in maintaining normal conditions in the vagina. However, most gynecologists have assumed a neutral attitude because they have seen no harm result from the tampons.

Many young girls use the small tampons without apparent harm. However, girls who have difficulty in inserting the tampons, or who are uncomfortable when the tampons are in place, should not persist in using them.

ANTUITRIN S AND HAY FEVER

To the Editor—One of my patients has asked me whether or not the administration of antuitrin S increases the symptoms of hay fever. I have never been able to find an answer to this question. Will you kindly advise me?

Edward B. Markey, M.D., Dayton, Ohio

ANSWER—Many individuals suffering from hay fever and asthma are of the allergic diathesis. They readily become sensitive to a variety of substances and this may include antuitrin S. This is particularly true in the antuitrin S, which is a derivative of animal tissues, is given by injection. Symptoms of hay fever are known to have been accentuated and continued by the superimposition of several allergens.

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BRONCHIECTASIS IN CHILDHOOD

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AND

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PHILADELPHIA

Bronchiectasis was first described as a disease entity by Laënnec in 1819. For nearly a century, however, positive recognition of the condition was possible only at the autopsy table; its antemortem diagnosis was purely an inferential one. When Chevalier Jackson,¹ in 1918, demonstrated that the bronchial caliber in the living patient could be determined roentgenographically by the use of insufflated bismuth powder as a contrast medium, a new era in diagnosis was ushered in. In 1922 another radiopaque substance became available for bronchography with the introduction of iodized oil by Sicard and Forestier.² Widespread application of contrast roentgenography during the years that followed resulted in a considerable advance in the understanding of the salient points of bronchiectasis. While several features of the lesion continue to form the basis for controversial opinions among clinicians and pathologists, the progressive increase in knowledge has made two facts clearly evident. One is that in a large number of patients whose history and physical status formerly would have led to the presumptive clinical diagnosis of bronchiectasis actual dilatation of the bronchi cannot be demonstrated. The other is that in a great many patients with chronic bronchopulmonary disease, either bronchiectatic or nonbronchiectatic, the process has its inception in childhood.

Desirous of studying in detail the various clinical aspects of bronchiectatic disease in children, we selected from among the many hundreds of children examined and treated since 1930 in the bronchoscopic clinic at Temple University Hospital 75 with bronchiectasis and, for contrast, an equal number with similar symptoms but a normal bronchographic appearance. For the sake of convenience and for want of a better term, we designated the condition of the latter group chronic tracheobronchitis. The patients chosen in the two groups were those on whom the data were the most complete. The diagnosis in each instance was based solely on the presence or absence of bronchial dilatations as revealed by contrast roentgenography. Iodized oil was employed as the contrast medium and was instilled either bronchoscopically or by means of a soft rubber endotracheal

or endobronchial catheter placed in the proper position with fluoroscopic aid. In virtually all the children the bronchographic pictures embraced every part of the bronchial tree, so that the distribution and the degree of gross anatomic changes were readily apparent. The patients were followed clinically, bronchoscopically and bronchographically for varying lengths of time, some as long as eight years. No children with a history of a foreign body were included, for we feared that because of the disproportionately large number of such children seen in our clinic their inclusion might render accurate comparison of our data with those of other investigators impossible.

CLINICAL FEATURES

The ages of the patients studied are shown in table 1. There were 33 boys and 42 girls in the bronchiectatic group and 43 boys and 32 girls in the tracheobronchitic group. The earliest age at which bronchiectasis was diagnosed was 13 months, and that at which tracheobronchitis was diagnosed, 14 months. For a number of children whose age at onset was listed as less than 2 years the history of a productive cough since birth was obtained. The duration of symptoms at the time the patient was first seen in our clinic ranged from four weeks in 1 case of bronchiectasis to twelve years in 1 case of tracheobronchitis.

The symptoms dated back to a specific illness in 47 (63 per cent) of the children with bronchiectasis and in 21 (28 per cent) of the others. As illustrated by the figures in table 2, pneumonia was the most common precipitating disease in both groups. The frequent occurrence of a definite disease of the respiratory tract immediately prior to the onset of the symptoms in bronchiectatic children has been noted by Boyd,³ Marcy,⁴ Warner⁵ and Raia.⁶ Pneumonia, pertussis and measles, separately or in combination, have been the diseases present in most of the cases. In Raia's⁶ series, bronchiectasis originated with an attack of pneumonia in 67 per cent of the cases.

The bronchial dilatations were confined to one lung in 44 (59 per cent) of our 75 patients (table 3). Sacular ectasia was present in 9 children, cylindric ectasia in 46 and a combination of the two in 20. The lower lobe of each lung was involved in 51 patients, the middle lobe of the right in 18, the upper lobe of the left in 7 and the upper lobe of the right in 4. In regard to segmental distribution, in 4 of the 7 cases of bronchiectasis of the upper lobe of the left lung the branches of the

From the Chevalier Jackson Bronchoscopic Clinic, Temple University Hospital.

1. Jackson, Chevalier: The Bronchial Tree; Its Study by the Insufflation of Opaque Substance in the Living, *Am. J. Roentgenol.* 5: 454 (Oct.) 1918.

2. Sicard, J. A., and Forestier, J.: Iodized Oil as Contrast Medium in Radioscopy, *Bull. et mém. Soc. méd. d. hôp. de Paris* 46: 463 (March 17) 1922.

3. Boyd, G. L.: Bronchiectasis in Children, *Canad. M. A. J.* 25: 174 (Aug.) 1931.

4. Marcy, C. H.: Bronchiectasis, *Internat. Clin.* 1: 144 (March) 1937.

5. Warner, W. P.: Factors Causing Bronchiectasis; Clinical Application to Diagnosis and Treatment, *J. A. M. A.* 105: 1666 (Nov. 23) 1935.

6. Raia, Antoinette: Bronchiectasis in Children, with Special Reference to Prevention and Early Diagnosis, *Am. J. Dis. Child.* 60: 852 (Oct.) 1938.

lingula were the only ones affected. Otherwise no predilection for any particular bronchopulmonary segment was evident. Limitation of bronchiectatic changes to the lingula, in association with similar changes in the adjacent lower lobe, has been frequently observed by Perry and King⁷ and others. The degree of bronchial enlargement was pronounced in 15 of our patients. In

TABLE 1.—Age of Patients at Onset of Symptoms and at Time of Bronchographic Diagnosis

Age, Yr	At Onset of Symptoms			At Time of Diagnosis		
	Number of Children with Bronchiectasis	Number of Children with Tracheobronchitis	Totals	Number of Children with Bronchiectasis	Number of Children with Tracheobronchitis	Totals
Less than 2	16	18	34	3	3	6
2 to 4	20	24	44	8	13	21
5 to 9	29	26	55	32	44	76
10 to 14	10	7	17	32	15	47
Totals	75	75	150	75	75	150

all but 1 of these the bronchiectasis was unilateral, and in 7 it involved but one lobe.

That the bronchiectatic and the tracheobronchitic children were comparable as to the nature and intensity of their symptoms is demonstrated by the figures in table 4. The only significant difference was the presence of fetid sputum in 23 per cent of the patients in group 1, in striking contrast to its complete absence in those in group 2. At that, the number of patients with foul smelling sputum was relatively small, a fact which lends support, in regard to children at least, to the observations of Marcy,⁴ Warner⁵ and Hedblom⁸ that the classic picture of noisome expectoration in bronchiectasis actually is far less common than is generally supposed. In Warner's⁵ series the sputum was malodorous in 20 per cent of the patients. Jackson and Jackson,⁹ in describing the putrefaction which gives rise to the unpleasant odor in patients with bronchiectasis, likened the affected bronchi to septic tanks. They pointed out that when the purulent exudate is first produced it is so thick and of such high viscosity that it cannot be expelled into the larger bronchi. With stagnation the degree of viscosity is reduced by bacterial activities until it ultimately reaches a state that will permit bechic expulsion.¹⁰

It will be noted that of the 22 children who had hemoptysis on one or more occasions more than two thirds were in the bronchiectatic group and that of 7 whose hemoptysis was massive 6 were in the bronchiectatic group. Boyd³ has pointed out that expectoration of blood is more common in bronchiectasis than in any other pulmonary disease of childhood. Apparently it is not as frequent in children as it is in older persons, however. According to Hedblom⁸ hemoptysis of some grade occurs in more than half of the adults with bronchiectasis. Not a single instance of the dry bronchiectasis described by Bezançon¹¹ and his associates was

observed in our series. All the patients in the two groups had a chronic cough productive of purulent sputum. In most of them the severity of the cough and of the expectoration varied considerably from time to time, usually being aggravated by the supervention of an acute infection of the respiratory tract. In 28 (19 per cent) the cough was continuously distressing. The general health was not seriously impaired in the great majority of the patients. With the exception of 2 children who required transfusions to replace blood lost in profuse hemoptysis none of the patients had severe secondary anemia.

There was no relation between the severity of the symptoms and the number of lobes or lungs involved in the bronchiectatic process. A persistently severe cough and expectoration of fetid sputum were present in a slightly greater proportion of the patients with large dilatations, however, than of the group as a whole. Of the 15 children with pronounced ectasia, 5 had an incessant cough and malodorous sputum, 2 had a continuously distressing cough with odorless sputum and 2 others had noisome sputum with a comparatively mild cough. These data suggest that a large bronchial cavity is somewhat more likely to provide a nidus for the development of "septic tank" phenomena than is a small one. Nevertheless, an evaluation of the symptoms in our series as a whole cannot but lead to the view, shared by Head¹² and by Ballou, Singer and Graham,¹³ that the clinical picture is not a reliable index of the degree of anatomic damage.

The results of physical examination of the chest were not uniform in our patients. The signs elicited were not constant in individual patients, and they did not correspond to the extent or the severity of the bronchiectasis. They varied with the quantity of exudate in the tracheobronchial tree and with the site and degree of alveolar consolidation. Clubbing of the fingers was

TABLE 2.—Age of Sixty-Eight Children at Time of Specific Antecedent Factor

Nature of Original Factor	Number of Children in Various Age Groups at Time of Original Factor					
	Age of Children with Bronchiectasis, Yr.			Age of Children with Tracheobronchitis, Yr.		
	Less Than 2	2 to 4	5 to 9	10 to 14	Totals	
Pneumonia.	6	6	12	1	25	2
Abscess of lung			1		1	
Pertussis		5	1		6	
Measles.					0	
Tonsillectomy		1	7	1	9	
Influenza	1				1	
Pertussis and pneumonia		1	1		2	
Measles and pneumonia		1			1	
Cyanoosis at birth	1				1	
Totals	8	14	22	3	47	3

present in 8 of the bronchiectatic children, 2 of whom had large dilatations. It did not occur in any of the others.

Chronic inflammatory disease of the nasal accessory sinuses was evident clinically and demonstrable roentgenographically in 48 (64 per cent) of the children in the bronchiectatic group and in 46 (61 per cent) of

7. Perry, K. A., and King, D. S. Bronchiectasis. A Study of Prognosis Based on Follow Up of Four Hundred Patients, *Am. Rev. Tuberc.* 41: 531 (May) 1940.
8. Hedblom, C. A. Pathogenesis, Diagnosis and Treatment of Bronchiectasis, *Surg., Gynec. & Obst.* 52: 406 (Feb.) 1931.
9. Jackson, Chevalier, and Jackson, C. L. The Bronchiectatic Septic Tank, Its Prophylaxis and Treatment, *Am. Rev. Tuberc.* 30: 599 (Dec) 1934.
10. Jackson, Chevalier, and Jackson, C. L. Bronchoscopy, Esophagoscopy and Gastrosocopy, Philadelphia, W. B. Saunders Company, 1934, p. 325.
11. Bezançon, F.; Weil, M. P.; Azoulay, R., and Bernard, E. Dry Hemoptysis Type of Bronchiectasis, *Bull. Acad. de med., Paris* 91: 100 (Jan. 22) 1923.

12. Head, J. R. The Treatment of Bronchiectasis, *M. Clin. North America* 19: 1777 (Jan.) 1936.
13. Ballou, Harry, Singer, J. J., and Graham, E. A. Bronchiectasis, Etiology and Pathology, *J. Thorac. & Surg.* 1: 154 (Dec) 1931.

those in the tracheobronchitic group. In 1 patient, a girl with unilateral bronchiectasis, the sinus disease did not make its appearance until she had been under our observation for four years. In all the others the sinusitis was present at the time of the bronchographic diagnosis. The incidence of sinus disease varied according to the age of the patient, being decidedly lower in infants than

TABLE 3.—Extent and Distribution of Bronchiectasis in Seventy-Five Cases

Location of Bronchial Dilatations	No. of Cases
Right lung	24
Upper lobe	1
Middle lobe	2
Lower lobe	12
Middle and lower lobes	8
Upper, middle and lower lobes	1
Left lung	20
Lower lobe	15
Upper and lower lobes	5
Both lungs	31
Lower lo	
Lower lo	
Lower lobe of both and upper lobe of left	1
Middle lobe of right and lower lobe of left	1
Upper, middle and lower lobes of right and lower lobe of left	1
All 5 lobes	1

in older children. Coexisting sinusitis was noted in only 44 per cent of the children seen before the age of 5 years, whereas it was found in 66 per cent of those whose condition was diagnosed at a more advanced age. Raia⁶ observed sinus disease in 82 per cent of her bronchiectatic children. With regard to the incidence in adults with bronchiectasis, Perry and King⁷ reported 66 per cent, Walsh and Meyer¹⁴ 67 per cent, Hodge¹⁵ 75 per cent, Farrell¹⁶ 79 per cent and Clerf¹⁷ 82 per cent. Moersch,¹⁸ on the other hand, has been able to find sinusitis in only 33 per cent of his patients with bronchial dilatations. Clerf¹⁹ and Goodale²⁰ called attention to the frequent presence of sinus infection in association with bilateral bronchiectasis, in contradistinction to its infrequent occurrence with unilateral dilatation, apparently suggesting an etiologic relationship between the paranasal infection and the bronchial lesion. This correlation did not obtain among our patients. Sinusitis was present in 20 (64.2 per cent) of the children with bilateral ectasia and in 28 (63.6 per cent) of those with unilateral dilatation. Moreover, it was present in 60 per cent of the patients whose bronchiectasis was limited to one lobe.

On the whole the bronchopulmonary symptoms were somewhat more severe in the children with sinusitis than they were in the others. That a considerable part of the symptom complex was due to the accompanying sinus disease was indicated by the decided accentuation which occurred during flare-ups of paranasal sinusitis and by the dramatic alleviation which often followed the establishment of free drainage in the cases in which

sinus obstruction existed. Graham²¹ had occasion to observe directly the effects of acute sinus disease on the mucous membrane of bronchial fistulas. He noted that approximately twenty-four hours after the onset of the sinus infection the bronchial mucosa became acutely inflamed; with the subsidence of the sinusitis the inflammatory bronchial reaction promptly cleared up. The sinus infections in our children all responded satisfactorily to therapy. Radical operations were performed on 3 patients, conservative measures sufficing for the remainder. Adequate treatment of the sinus disease resulted in definite improvement in the extranasal symptoms in most cases, but in no instance did it lead to their permanent abolition.

Acute empyema thoracis, independent of lobectomy, developed in 7 children with bronchiectasis. In each the lesion was effectively controlled by thoracostomic drainage. Another patient at the time she was first seen had a nonbronchiectatic abscess in the upper lobe and mild cylindric bronchiectasis in the lower lobe of the left lung. Hers was the only case of pulmonary abscess in the entire series. None of the other diseases, such as amyloidosis and brain abscess, which have so often been observed to constitute a part of the bronchiectatic picture in adults with long-standing bronchiectasis, were evident in any of the children.

Allergic manifestations were comparatively uncommon among our children with bronchiectasis. Only 3 had asthma and recurrent urticaria. In the tracheobronchitic group, on the other hand, 13 were asthmatic, 3 had chronic eczema, 1 had hay fever and 1 had rose fever. In every case the allergic disease was already established at the time of the bronchographic diagnosis. The low incidence of asthma in our bronchiectatic patients is at considerable variance with the 32 per cent reported by Watson and Kibler,²² who voiced the belief that allergic bronchitis is often a precursor of bronchiectasis. Likewise, the bronchoscopically aspirated

TABLE 4.—Relation of Symptoms to Presence and Extent of Bronchiectasis

	Number of Patients			
	Unilateral Bronchiectasis		Bilateral Bronchiectasis	Tracheobronchitis
	Limited to 1 Lobe	More Than 1 Lobe	Totals	
Continuously severe cough...	6	6	12	10
Frequent febrile episodes...	4	2	6	8
Pain in chest...	2	3	5	3
Dyspnea...	3	1	4	9
...	3	1	4	6
...	4	2	6	1
...	2	5	7	6
...	3	8	11	0
Totals	30	14	44	75

secretions in our patients did not contain the large proportions of eosinophilic leukocytes observed by these authors.

Except for 2 children with bronchiectasis who had rheumatic heart disease characterized by an advanced degree of myocardial and valvular damage, none of our patients had any chronic disease other than those already noted. Sippe²³ mentioned hypoglycemia as common in

14. Walsh, T. W., and Meyer, O. O.: Coexistence of Bronchiectasis and Sinusitis, *Arch. Int. Med.* 61: 890 (June) 1938.

15. Hodge, G. E.: Relation of Bronchiectasis to Infection of the Paranasal Sinuses, *Arch. Otolaryng.* 22: 537 (Nov.) 1935.

16. Farrell, J. T., Jr.: The Importance of Early Diagnosis in Bronchiectasis: A Clinical and Roentgenologic Study of One Hundred Cases, *J. A. M. A.* 106: 92 (Jan. 11) 1936.

17. Clerf, L. H.: The Interrelationship of Sinus Disease and Bronchiectasis with Special Reference to Prognosis, *Laryngoscope* 44: 568 (July) 1934.

18. Moersch, H. J., in discussion on Hodge, G. E.: Relation of Bronchiectasis to Infection of the Paranasal Sinuses, *Arch. Otolaryng.* 22: 537 (Nov.) 1935.

19. Clerf, L. H.: The Bronchoscopic Treatment of Bronchiectasis and Lung Abscess, *Am. Rev. Tuberc.* 24: 605 (Dec.) 1931.

20. Goodale, R. L.: An Analysis of Seventy-Five Cases of Bronchiectasis from the Viewpoint of Sinus Infection, *Ann. Otol., Rhin. & Laryng.* 47: 347 (June) 1938.

21. Graham, E. A.: Observations on Reaction of Bronchial Fistulae to Acute Infections of Upper Respiratory Tract, *Am. J. Surg.* 14: 382 (Oct.) 1931.

22. Watson, S. H., and Kibler, C. S.: The Role of Allergy in Bronchiectasis, *J. Allergy* 10: 364 (May) 1939.

23. Sippe, Clive: Hypoglycemia and Ketosis: Relationship to Chronic Antral Disease and Bronchiectasis, *M. J. Australia* 1: 675 (May 26) 1934.

bronchiectasis, but in the few children in our series for whom clinical analysis of the blood was performed the dextrose level invariably was normal. Several authors have described cases of bronchiectasis associated with situs inversus, Adams and Churchill²⁴ observing the combination in 5 cases. Situs inversus was not encountered among our 150 children.

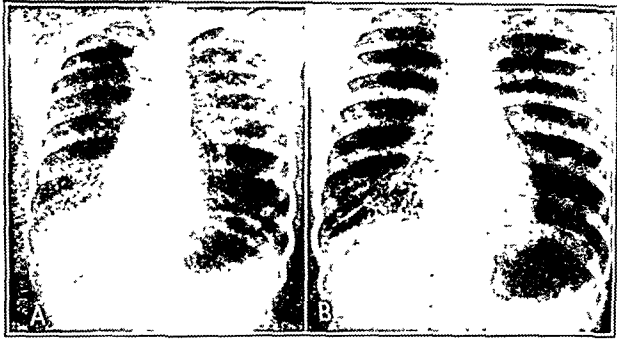


Fig. 1.—Pseudobronchiectasis. A, the lower lobe of the right lung is atelectatic; its closely packed, shortened, clublike bronchi appear to be widened. B, (two months later), reexpansion of the previously collapsed lower lobe of the right lung has occurred; its bronchi have been restored to their normal length and position, and their caliber is now normal.

The appearance in the roentgenograms of the chest of the individual patients varied from time to time according to the acuteness of the illness. A number of children presented roentgenographic evidence of some degree of involvement of the pulmonary parenchyma during exacerbations of their symptoms. In others the pulmonic fields remained free of abnormal densities throughout observation. Cavities which subsequently were proved bronchiectatic were visible in 3 patients. Irregular, patchy shadows, representing either scattered pneumonic consolidations or small areas of atelectasis, were present at some stage of their disease in 23 patients with bronchiectasis and in 15 with tracheobronchitis. Atelectasis of one or more lobes occurred in 12 children in the bronchiectatic group and in 8 in the other group. Pronounced accentuation of the bronchovascular mark-

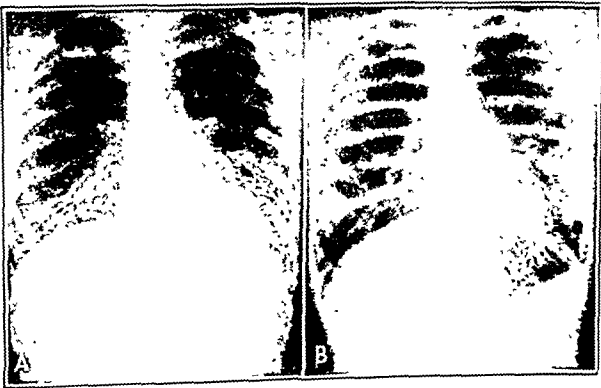


Fig. 2.—Appearance in case in which the bronchial dilatations became smaller. A, cylindrical and sacular dilatations are present in the bronchi of the lower lobe of the left lung and the adjacent portion of the upper lobe. B (two months later), the bronchiectasis is much less noticeable. Further improvement did not occur, however, during the two years the patient was followed.

ings, particularly in the lower lobes, constituted the most severe change in 21 bronchiectatic and 33 tracheobronchitic patients. The roentgenograms of 15 children with bronchial dilatations and of 23 without dilatations

were at all times normal or at most showed a questionable increase in the markings. Pleural thickening was present in 22 of the bronchiectatic patients, including the 7 with empyema mentioned previously; it was not evident in any of the tracheobronchitic children. Emphysematous blebs, observed by Andrus²⁵ to accompany bronchiectasis in many instances, were not apparent in any of our patients.

As can be seen in table 5, roentgenographic changes confined to one pulmonic field were strongly suggestive of unilateral bronchiectasis. Otherwise there was no correlation between the distribution of the roentgenographic changes and that of the dilatations. As a matter of fact, patients with bilateral changes were more likely to have paranasal sinus disease than bronchiectasis. Of 75 patients with roentgenographic changes in both sides of the chest, 55 had chronic sinus disease, whereas only 29 had bronchiectasis. In the 15 children with large bronchial dilatations, prior to the instillation of iodized oil the changes in the areas affected were as follows: irregular, patchy shadows in 6, exaggerated markings in 4, cavities in 3 and lobar atelectasis in 2.

Singer and Graham,²⁶ Anspach²⁷ and others have pointed out that the occurrence of lobar atelectasis often antedates the demonstration of bronchial dilatations. The experience of Jackson and Jackson²⁸ in cases of

TABLE 5.—Relation Between Extent of Roentgenographic and Bronchoscopic Changes and Extent of Bronchiectasis

	Number of Cases		
	Unilateral Bronchi- ectasis 44	Bilateral Bronchi- ectasis 31	Tracheo- bronchitis 75
Roentgenographic changes			
Minimal or none.....	5	10	23
Unilateral.....	29	2	8
Bilateral.....	10	19	44
Abnormal bronchoscopic changes			
None.....	0	0	1
Unilateral.....	18	0	4
Bilateral.....	26	31	70

foreign body has been that bronchiectasis is found more frequently in lobes which have been drowned in their own secretions for a long time than in those in which the duration of the bronchial obstruction has been short. King,²⁹ Andrus³⁰ and Holinger³¹ have made similar observations in cases of bronchial occlusion originating from causes other than a foreign body. In our series it was difficult to estimate the duration of the collapse, for in all but 3 patients it was present at the time of the initial examination. Of the 3 children in whom lobar atelectasis developed during the period of observation, 1 had recurrent collapse of the lower lobe of the left lung and the other 2 presented the roentgenographic picture of a shrunken, airless lower lobe of the left lung, lower lobe of the right lung or middle lobe of the right lung on different occasions. The interval between the discovery of the collapse and the attainment of

24. Adams, Ralph, and Churchill, E. D.: Situs Inversus, Sinusitis, Bronchiectasis: A Report of Five Cases, Including Frequency Statistics. J. Thoracic Surg. 7: 206 (Dec.) 1937.

25. Andrus, P. M.: Chronic Nonspecific Pulmonary Disease, Am. Rev. Tuberc. 41: 99 (Jan.) 1940.
26. Singer, J. J., and Graham, E. A.: Roentgen Ray Study of Bronchiectasis, Am. J. Roentgenol. 15: 54 (Jan.) 1926.
27. Anspach, W. E.: Atelectasis and Bronchiectasis in Children: A Study of Fifty Cases Presenting a Triangular Shadow at the Base of the Lung, Am. J. Dis. Child. 47: 1011 (May) 1934.
28. Jackson, Chevalier, and Jackson, C. L.: Diseases of the Air and Food Passages of Foreign Body Origin, Philadelphia, W. B. Saunders Company, 1936, p. 115.
29. King, D. S.: Hemorrhagic Bronchiectasis and Its Surgical Cure, Internat. Clin. 1: 130 (March) 1937.
30. Andrus, P. M.: Bronchiectasis: An Analysis of Its Causes, Am. Rev. Tuberc. 34: 46 (July) 1937.
31. Holinger, P. H.: The Role of Inflammatory Bronchial Stenosis in the Etiology of Bronchiectasis Ann. Otol., Rhin. & Laryng. 47: 1572 (Dec.) 1938

reexpansion was only a few weeks in each instance. The bronchi in all 3 children were repeatedly shown to be normal after re-aeration of the affected areas. Of the other 17 patients, the length of the history ranged from four weeks to nine years for the bronchiectatic group and from five weeks to one year for the tracheobronchitic group. The onset of symptoms dated from a specific factor in 14: pneumonia in 10, tonsillectomy in 3 and cyanosis at birth in 1. The entire left lung was atelectatic in 1 patient, the lower lobe of the left lung in 6, the lower lobe of the right lung in 3, the middle lobe of the right lung in 6 and the middle and lower lobes of the right lung in 1. In 8 children, all of whom had dilated bronchi in the lobes involved, reexpansion did not occur. Of the other 9, bronchograms made after re-aeration disclosed ectasia in 4 and normal-sized bronchi in 5.

Jennings³² has called attention to the fact that the widening demonstrable through the use of iodized oil in the closely packed bronchi of a collapsed lobe frequently disappears when the lobe reexpands. Lander and David-

aid of telescopic magnification, a procedure which is impracticable in the case of children. A pronounced outpocketing of one of the larger bronchi may be apparent on endoscopic examination, but the recognition of cylindric dilatation is rendered highly uncertain by the physiologically rhythmic variation in length and width exhibited by the bronchi during the phases of the



Fig. 3.—Appearance in case in which the bronchial dilatations increased in size. *A*, cylindric dilatations are present in the atelectatic lower lobe of the left lung and the adjacent portion of the upper lobe. *B*, (two years later), the bronchiectasis in the lower lobe of the left lung is much more pronounced.

TABLE 6.—*Bronchoscopic Abnormalities in One Hundred and Fifty Children*

	Number of Cases		
	Unilateral Bronchiectasis	Bilateral Bronchiectasis	Tracheobronchitis
Very mucousy.....	11	..	4
.....	12	19	4
.....	12	..	2
.....	9	12	63
No pus present.....	..	..	2
.....	5	..	1
.....	13	15	48
Thickening of bronchial spurs			
Unilaterally.....	4	..	3
Bilaterally.....	5	3	16
Wide carina.....	1	2	12
Bilateral thickening of mucosa.....	2	4	12
Granulations.....	3	..	..
Stenosis of orifice of middle lobe of right lung.....	1	..	2
Exaggeration of tussive collapse of trachea and bronchi.....	1	..	5

son³³ considered this phenomenon to be an indication that bronchiectasis is a reversible process, but in all likelihood it is due to the restoration of the previously crowded, shortened, clublike bronchi to their normal length and position rather than to their recovery from true bronchiectasis. The term pseudobronchiectasis, suggested by Jackson,³⁴ seems admirably suited to the actual anatomic state. We observed 4 patients with pseudobronchiectasis among our children; we placed all 4 in the tracheobronchitic group.

A point that has not been given sufficient emphasis in the literature is that actual bronchiectatic dilatation rarely can be seen bronchoscopically. The main stem and the lower lobe bronchi, the only ones usually permitting the passage of an illuminated bronchoscope, are customarily not the seat of permanent ectasia. The segmental bronchi and their branches are the ones involved in virtually all cases, and they for the most part are inaccessible to direct visual exploration, even with the

respiratory cycle. In our series definite ectasia could not be made out on specular examination in any of the patients.

The bronchoscopic data on our children are recorded in table 6. As to the character of the exudate, the patients were classified according to the most severe form present during their respective periods of observation. In 1 of the 2 children in whom no secretion was found endoscopically at any time, the mucosa was chronically congested and the spurs were thickened; so in reality only 1 patient had an apparently normal tracheobronchial tree at all times. The most striking bronchoscopic difference between the bronchiectatic and the tracheobronchitic children was the presence of copious or extremely thick pus in the smaller bronchi in



Fig. 4.—Appearance in case in which the bronchial dilatations increased in size. *A*, small saccular dilatations are present in the bronchi of the lower lobe of the left lung. *B* (three and one-half years later), the dilatations have become much larger.

the majority of the former group and in only a negligible number of the latter group. Not infrequently the secretion in a bronchiectatic child was so abundant that it issued from the proximal end of the bronchoscope as soon as the instrument was inserted into the trachea. In many instances the pus was nearly solid and its removal by suction from the deeper branches was accomplished with considerable difficulty. When the glass

32. Jennings, G. H.: Reexpansion of the Atelectatic Lower Lobe and Disappearance of Bronchiectasis, *Brit. M. J.* 2: 963 (Nov. 13) 1937.

33. Lander, F. P. L., and Davidson, Maurice: The Etiology of Bronchiectasis (with Special Reference to Pulmonary Atelectasis), *Brit. J. Radiol.* 11: 65 (Feb.) 1938.

34. Jackson, C. L.: Personal communication to the authors.

collecting tube was inverted the semisolid pus often failed to run down its sides. Except for the quantity and viscosity of the exudate the differences in the endoscopic appearance in the two groups were not especially significant. Why widening of the carina, presumably caused by enlargement of the mediastinal lymph glands, should have occurred with greater frequency in the tracheobronchitic patients than in the others is hard to explain. It is noteworthy that only a few of the children with it exhibited positive cutaneous reactions to tuberculin.

The small number of patients in our series with visibly narrowed bronchial orifices fails to support the contention of Holinger³¹ that inflammatory bronchial stenosis is a frequent bronchoscopic finding in children with atelectasis and bronchiectasis. Of the 3 patients with perceptible narrowing of the opening of the middle lobe of the right lung, the constriction in 2 was due largely to chronic thickening of the spur of the middle lobe

correspond to those of Kolmer,³⁵ Greey³⁶ and Hamman.³⁷ The relative frequency with which various organisms were found in smears and cultures of the bronchial exudate in the 148 patients from whom bronchoscopic specimens could be obtained for bacteriologic study is shown in table 7. Aerobic and anaerobic cultures were made each time the pus was examined. From 3 of the patients with bronchiectasis hemolytic streptococci were persistently obtained in pure culture. From the remainder the organisms present were obtained in mixed culture. Specimens of bronchial secretion taken at different times from the same child often contained different organisms. No fungi or tubercle bacilli were recovered from any of the patients.

The incidence of spirochetes and fusiform bacilli in the bronchial exudates of our bronchiectatic children was considerably lower than that generally observed in adults. Smith³⁸ has been able to demonstrate these organisms in more than 80 per cent of his adult patients with dilatations. Their comparative rarity in children suggests that fusospirochetal bacteria ordinarily are secondary rather than primary invaders in bronchial infections. The much more common occurrence of chronic oral disease in adults affords a reasonable explanation for the greater frequency with which these organisms are found in the vicinity of the bronchial lesions in older persons. The total number of children in our series whose bronchoscopically aspirated secretions contained spirochetes, fusiform bacilli or both was 14. In the 2 bronchiectatic children in whom spirochetes were found they were present in association with fusiform bacilli; in the tracheobronchitic patient they were present independently. There was no relation between the presence of fusospirochetal organisms and the character or odor of the bronchial exudate.

TABLE 7.—*Bacteria in Bronchoscopically Aspirated Secretions of One Hundred and Forty-Eight Children*

Micro Organism	Number of Children in Whom Micro Organism Was Found	
	With Bronchiectasis	With Tracheobronchitis
Hemolytic streptococcus	47	35
Nonhemolytic streptococcus	49	38
Hemolytic staphylococcus	9	15
Nonhemolytic staphylococcus	15	21
Pneumococcus	27	36
Micrococcus catarrhalis	41	47
Hemophilus influenzae	12	7
Escherichia coli	2	..
Bacillus pyocyaneus	2	..
Gram negative diplococcus	2	1
Neisseria sicca	4	..
Neisseria flava	1	..
Bacteroides	10	4
Spirochete	2	1
Diphtheroid organism	3	1
Bacillus fusiformis	8	5

and was permanent. In neither instance was there a coexisting lobar collapse. One of the patients had bronchiectasis of the middle and lower lobes of the right lung; the other had no dilatations. The stenosis in the third child was due to an acute inflammatory swelling of the mucous membrane and was associated with atelectasis of the middle lobe. When the inflammatory reaction subsided, reexpansion of the collapsed lobe occurred and subsequent bronchographic examination revealed no ectasia.

The figures in table 6 illustrate that unilateral changes seen bronchoscopically almost invariably indicate the presence of unilateral bronchiectasis. Bilateral changes were less significant, for the inflammatory involvement of the endoscopically accessible parts of the bronchial tree tended to be bilateral, irrespective of the existence of dilatations or their distribution. As in the case of the roentgenograms of the chest, bronchoscopic evidence of disease on both sides was more likely to be accompanied by paranasal sinusitis than by bronchiectasis. Of 127 children with bilateral endoscopic changes, 83 had sinus disease and only 57 had bronchiectasis.

There was nothing distinctive about the bacterial flora in the bronchi of either the bronchiectatic or the tracheobronchitic children. Our observations in this respect

RESULTS OF TREATMENT

General supportive measures, including confinement to bed during exacerbations, formed the basis for the therapeutic program for the patients in the two groups. As most of the children were followed as outpatients, the extent to which these measures could be controlled was limited. Symptomatic treatment for every patient was augmented by efforts to keep the air passages free of accumulated exudate, combat the bronchial infection and eradicate extrathoracic foci of disease. The frequency of bronchoscopic aspiration was determined largely by the character and severity of the symptoms. Occasionally, during bronchoscopy bronchial lavage was performed with physiologic solution of sodium chloride or with an antiseptic solution, such as merthiolate 1:10,000 or mercuraphen 1:10,000. In several instances chlorophyll in a 0.2 per cent aqueous solution was instilled. In others, gomenol (a caput oil from *Melaleuca viridiflora*) 20 per cent or monochlorophenol was applied with swabs. The bronchial trees of a number of patients were irrigated with hypertonic saline solution by the Stitt³⁹ catheter method for short periods. For some of the older children bronchoscopic aspiration was supplemented with the periodic application of pos-

35 Kolmer, J. A. Bronchial Disinfection and Immunization. The Effects in Rabbits of Intrabronchial Injections of Various Chemical Disinfectants, *Arch. Int. Med.* 51: 346 (March) 1933.

36 Greey, P. H. The Bacteriology of Bronchiectasis. An Analysis Based on Nine Cases in Which Lobectomy Was Done, *J. Infect. Dis.* 50: 203 (March) 1932.

37 Hamman, Louis. Chronic Nontuberculous Bursal Infections of the Lungs, *Am. Rev. Tuberc.* 40: 363 (Oct.) 1939.

38 Smith, D. T. Etiology of Primary Bronchiectasis, *Arch. Surg.* 21: 1173 (Dec.) 1930.

39 Stitt, H. L. Bronchial Aspiration and Irrigation with a Hypertonic Saline Solution, *J. Med.* 8: 112 (May) 1927.

tural drainage when the bronchial secretions were profuse and troublesome; for young children a regimen of this kind was not feasible. To the majority of the patients autogenous vaccines, prepared from organisms recovered from the bronchoscopically obtained secretions, were administered parenterally for varying lengths of time. In addition to all the other measures, careful attention was given to tonsillar and dental infections as well as to paranasal sinus disease, and appropriate therapy was instituted in each instance.

In the absence of an experimental division of our patients into properly controlled groups, each receiving only one form of therapy or no therapy at all, precise evaluation of the relative merits of the various procedures employed is impossible. Certain clinical observations may be worthy of note, however. The bronchoscopic removal of copious or viscid exudate often resulted in a dramatic subsidence of the patient's symptoms similar to that produced by the relief of paranasal sinus obstruction. Bronchial lavage, aside from its action in reducing the viscosity of the exudate, thereby facilitating its removal, appeared to add little if anything to the beneficial effects attending the use of simple bronchoscopic aspiration; none of the antiseptic solutions possessed any advantage over saline solution as a diluting agent. No striking therapeutic results could be directly attributed to the use of autogenous vaccines or to any of the other measures employed.

Surgical removal of the involved lobes in 5 of the bronchiectatic children was performed by Dr. W. Emory Burnett, with an excellent therapeutic result in each instance. The symptoms in many of the other patients were characterized by exacerbations and remissions of varying degree, so that it was extremely difficult to gage the sustained effects of nonsurgical treatment. Most of the children in the two groups were subjectively improved at the termination of the period of observation. In none was the complete and permanent disappearance of symptoms effected, however. Two of the children with bronchiectasis died. One, a girl aged 2½ years, died of generalized bronchopneumonia four months after the diagnosis of ectasia had been made. In the other, a girl of 13, congestive heart failure occasioned by severe myocardial and endocardial damage of rheumatic origin developed two years after the original bronchographic diagnosis. Neither patient had large bronchial dilatations.

Spread of the bronchiectatic process to previously uninvolved bronchi was not noted in any of the patients. The size of the existing dilatations remained unchanged in all but 3. In 1 child bronchographic examination two months after the diagnosis had been made disclosed a moderate reduction in the size of the affected bronchi. A definite dilatation remained, however, and no further change was evident during the two year follow-up study. In the other 2 children the ectasia became somewhat more pronounced over a period of years. In no instance was the alteration of the bronchographic picture accompanied by a corresponding change in the severity of the symptoms. Reference has been made by Anspach²⁷ and other investigators to the tendency of dilatations, when once formed, to increase in size with the passage of time. Whatever the tendency toward progression may be in adult life, it is clearly evident from the data in our series that such a tendency is not a prominent feature of bronchiectasis during childhood.

COMMENT

Success in the management of a specific disease is in a great measure dependent on the physician's familiarity with the diagnosis, the pathogenesis, the prophylaxis and the treatment of that disease. In regard to bronchiectasis, a positive clinical diagnosis can be made only bronchographically. The symptoms as a rule do not reflect the extent of the anatomic changes in the bronchi. The expectoration of noisome sputum in the absence of a suppurative intrapulmonary focus or empyema with a bronchopleural fistula is strongly suggestive of the existence of bronchial dilatations. The same is true, in a lesser degree, of hemoptysis. These symptoms offer no clue, however, to the site or the severity of the ectasia. There are no physical signs pathognomonic of bronchiectasis. Neither the appearance of the ordinary roentgenogram of the chest nor the bronchoscopic appearance is conclusive, although changes limited to one side usually point to the presence of unilateral dilatations. The bacteriologic picture is altogether non-specific. If one is to be accurate in the determination of the presence and distribution of bronchiectatic changes, therefore, one must rely solely on contrast roentgenography as the basis for the diagnosis.

Numerous theories have been postulated in recent years to explain the development of bronchiectasis, but in the final analysis the pathogenesis of the disease remains obscure. According to Sauerbruch,⁴⁰ Miller⁴¹ and other investigators the ectasia is congenital in most instances. Kline⁴² pointed out that regardless of the cause the essential abnormality is a defect in the muscular and elastic tissue of the bronchial wall. Robinson⁴³ described the defect as being the result of inflammatory destruction, with actual thickening of the wall from replacement fibrosis in many cases, an observation that suggests an acquired cause rather than a congenital one. Many investigators have expressed the belief that the foundation for localized bronchial enlargement is laid in the action of some dilating force on bronchi weakened by chronic infection. The exact nature of this dilating stress is uncertain. Marcy⁴ voiced the opinion that increased intrabronchial pressure during cough is the basic factor. Andrus,³⁰ on the other hand, pointed out that the bronchi in reality are subjected to a compressing force during expiration and cough. In the opinion of Warner,⁵ the normal enlargement during inspiration is exaggerated in inflamed bronchi, resulting in permanent dilatation. Other investigators have attributed the ectasia to the pressure exerted by retained secretions. Involvement of damaged bronchi in the contraction of fibrous tissue has long been considered an etiologic factor, particularly in cases in which bronchial dilatations are found in the midst of healed tuberculous lesions. The existence of a possible etiologic relationship between prolonged atelectasis and bronchiectasis is receiving increasingly wide recognition. Andrus,³⁰ in discussing the abnormal physical stresses which might be conducive to the production of bronchial dilatation, concluded that the only one capable of producing ectasia is the mechanical pull which is exerted on injured bronchi in areas of completely atelectatic pulmonary

40. Sauerbruch, F.: Zur Frage der Entstehung und chirurgischer Behandlung von Bronchiektasen, *Arch. f. klin. Chir. (Kongressbericht)* 148: 721 (1927).

41. Miller, J. A.: The Pathogenesis of Bronchiectasis, *J. Thoracic Surg.* 3: 246 (Feb.) 1934.

42. Kline, B. S.: The Pathology of Bronchiectasis and Lung Abscess, *Am. Rev. Tuberc.* 24: 626 (Dec.) 1931.

43. Robinson, W. L.: Bronchiectasis: A Study of the Pathology of Sixteen Surgical Lobectomies for Bronchiectasis, *Brit. J. Surg.* 21: 302 (Oct.) 1933.

tissue. Yet Adams and Escudero,⁴⁴ in their experimental work on dogs, have observed bronchiectasis following partial bronchial occlusion but none following total occlusion. The operation of a dilating force was questioned by McNeil, McGregor and Alexander,⁴⁵ who maintained that destruction of tissue and not dilatation is the essence of the process. These observers contended that a bronchiectatic cavity is not a dilated bronchus but an excavation in the lung substance that communicates with a bronchus. The wide divergence of opinion as to the presence or absence of dilating stresses is paralleled by a lack of unanimity in regard to the origin of the inflammation in the bronchial wall. Many investigators have expressed the belief that an intraluminal infection is the starting point, but Robinson's⁴³ demonstration of a wholly intact, normal bronchial mucosa with actively functioning cilia in dilated bronchi removed by lobectomy indicates that infection by a route other than the transmucosal one must occur in a large number of cases.

If bronchiectasis has no congenital basis but is due entirely to injury to the bronchial wall or to coexisting pulmonary disease, it is obvious from the failure of dilatations to develop in any of our 75 tracheobronchitic children that the factors which operate to produce ectasia are not effective in all cases. Also, the absence of spread of the dilative process to uninvolved bronchi in our bronchiectatic children, a finding identical with that of Perry and King⁷ in a much larger series, cannot be lightly dismissed. The frequency with which bronchiectasis can be demonstrated in patients who have had a long-standing lobar collapse points to its being an acquired disease, it is true, but definite proof that congenital defects play no part in the production of the lesion must await further study. Up to the present it has not been shown that in patients whose bronchiectasis is associated with atelectasis or some other bronchopulmonary disease the bronchi which are found to be dilated have previously been bronchographically normal.

When the cause and the evolution of bronchiectasis become more fully understood, physicians will perhaps be able to cope with the disease prophylactically on a purely rational basis. Until then, efforts in that direction must of necessity be largely empiric. It is known that bronchial dilatations are often associated with paranasal sinusitis, with chronic bronchial infection, with atelectasis and with parenchymatous pulmonary lesions. If bronchiectasis is a preventable disease, elimination of these disorders may be effective in precluding its development. From the early childhood of the patient, therefore, one should give careful attention to the correction of structural deformities in the nasal chambers which may predispose to the inauguration or to the perpetuation of inflammatory lesions. Therapy administered for an acute infection of the nose, sinuses, tonsils, bronchi or lungs should be adequate to insure the patient's complete recovery. If the infection is chronic when the patient is first encountered, proper measures for bringing it under control should be undertaken. The patency of the air passages should be maintained at all times, with bronchoscopic aid if necessary.

It is evident from the results in our series that symptomatic improvement in children with bronchiectasis can be attained by conservative therapy in most cases. Active progression in the size of the dilatations is not common during childhood. Severe deterioration in health and hemorrhagic episodes are not nearly as frequent as in later years. Amyloidosis and other serious complications are comparatively rare, for they ordinarily develop only after the bronchiectasis has been present for many years. The essential feature of a nonsurgical regimen is the treatment of the infection in the bronchi and in other parts of the respiratory tract. It is the same for children without dilatations as it is for those with ectasia, although the frequency of bronchoscopic aspiration is likely to be greater for the latter. Rist⁴⁶ has reported excellent results from the use of artificial pneumothorax, and Berck and Harris⁴⁷ have advocated the application of high voltage roentgen irradiation, but neither of these procedures has met with striking success when used by other investigators.

The symptomatic benefits resulting from conservative therapy in our bronchiectatic children lose much of their significance when we realize that in not a single instance did they represent an anatomic cure. Because of the decided tendency toward subjective exacerbations and remissions, the prognosis in bronchiectatic disease is most uncertain and early improvement is often short lived. Experience has taught us that as patients with bronchial dilatations pass from childhood into adult life the likelihood of unfavorable developments increases. As Head¹² has pointed out, relatively few persons who have ectasia in childhood survive to the age of 40. Of 96 patients studied by Perry and King⁷ in whom bronchiectasis developed before the age of 10 years, 65 per cent were dead within twenty years and 90 per cent within thirty years.

The outlook without operative intervention, we must admit, is exceedingly dark. If that outlook is to be brightened, it must be done by surgical means, for actual removal of the affected portions of the lungs is the only method at the disposal of physicians today whereby bronchial dilatations can be eradicated. Hesitation to recommend lobectomy or pneumonectomy for children because of the operative mortality is no longer justified. As a rule children tolerate lobectomy better than adults. Edwards⁴⁸ reported a 12 per cent mortality in his entire group of patients but none in the 38 patients under 16. Furthermore, the residual lung tissue compensates for the loss of the excised areas far better in growing children than it does in adults, as Bremer⁴⁹ has shown. If the indications for lobectomy exist, therefore, the operation should whenever possible be performed in childhood, before the disease has begun to make serious inroads into the patient's health. In the light of present knowledge one may not be able to prevent the occurrence of bronchial dilatations, but by early, accurate diagnosis and judicious surgical intervention one can save a large number of bronchiectatic children from a life of invalidism and perhaps a premature death.

Broad and Ontario streets.

46. Rist, Edouard: Collapse Therapy of Bronchiectasis, *Ann. Int. Med.* 7: 417 (Oct.) 1933.

47. Berck, Maurice, and Harris, William: Roentgen Therapy for Bronchiectasis, *J. A. M. A.* 108: 517 (Feb. 13) 1937.

48. Edwards, A. T.: Modern Principles of Treatment in Bronchiectasis; Based on One Hundred and Ninety-Nine Cases Treated by Lobectomy or Total Pneumonectomy (Harveian Lecture), *Brit. M. J.* 1: 177 (April 22) 1939.

49. Bremer, J. L.: Fate of the Remaining Lung Tissue After Lobectomy and Pneumonectomy, *J. Thoracic Surg.* 6: 336 (Feb.) 1937.

44. Adams, W. E., and Escudero, L.: Etiology of Bronchiectasis: Its Experimental Production and Clinical Study, *Tubercle* 19: 351 (May) 1938.

45. McNeil, C.; McGregor, A. R., and Alexander, W. A.: Studies of Pneumonia in Childhood: Bronchiectasis and Fibrosis of Lung, *Arch. Dis. Childhood* 4: 170 (Aug.) 1929.

CARDIAC INFARCTION

THE INCIDENCE AND CORRELATION OF VARIOUS
SIGNS, WITH REMARKS ON PROGNOSISFREDERICK H. SHILLITO, M.D.
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The cardinal diagnostic features of cardiac infarction following occlusion of a coronary artery are now well known. How often each of these signs occurs, when in the course of the illness it appears, and how long it may be expected to persist are matters largely of general impression. This study was designed to furnish factual evidence on these points. In the course of the analysis, certain guides to prognosis became apparent.

MATERIAL AND METHOD

The case records of 50 patients with uncomplicated cardiac infarction following coronary occlusion furnish the basis of this report. All were admitted to the wards and were seen daily by at least one of us. Of the group 44 entered the hospital within four days of the acute attack, and 25 were under observation from the first day. Seventeen patients died in the hospital. Necropsy, performed on 10, confirmed the clinical diagnosis.

The material was selected. For our purpose it was necessary to know with reasonable accuracy the time of coronary closure. If this could not be determined within a twenty-four hour period, the case was discarded. Only those cases were included in which there were no known complications, such as embolization to the lungs or to a peripheral artery, pneumonia or occlusion of another coronary branch with extension of the area of infarction during the period of observation. Because of these limitations, a number of additional cases which were studied were discarded.

PROCEDURE

During the progress of this work every patient admitted to the medical wards with the diagnosis of coronary occlusion was under our observation. Pulse rates and rectal temperatures were recorded in routine fashion. The arterial blood pressure was taken at least once each day. An electrocardiogram was made daily or every second day during the first week of illness, and thereafter once or twice a week. Complete blood counts were done with approximately the same frequency. The sedimentation rate of the erythrocytes was determined daily or biweekly, depending somewhat on the severity of the course. The Westergren technic, slightly modified, was employed.¹ The rate was calculated directly from the number of millimeters of fall at the end of one hour. Since none of the patients were anemic, no correction was made for slight variations in the hematocrit reading. The venous pressure was determined repeatedly by direct puncture, with the needle attached to a water manometer, according to the method of Moritz and von Tabora.²

The following criteria were arbitrarily adopted, most of them being accepted standards:

Tachycardia, heart rate over 80.

Fever, temperature above 99.6 F. (rectal).

Elevated venous pressure, above 100 mm. of water.

Fall in systolic blood pressure, a drop of 20 mm. or more during the first week of illness, as compared to the previous known level, or the level after complete recovery.

Leukocytosis, above 10,000 per cubic millimeter.

Increased sedimentation rate, over 20 mm. in one hour.

Electrocardiographic changes—those commonly accepted as evidence of cardiac infarction.³

INCIDENCE OF VARIOUS SIGNS

In chart 1 is shown the relative frequency with which nine different signs occurred in 50 cases. A friction rub was heard in only 20 per cent. Since these patients were examined with reasonable frequency by interns,

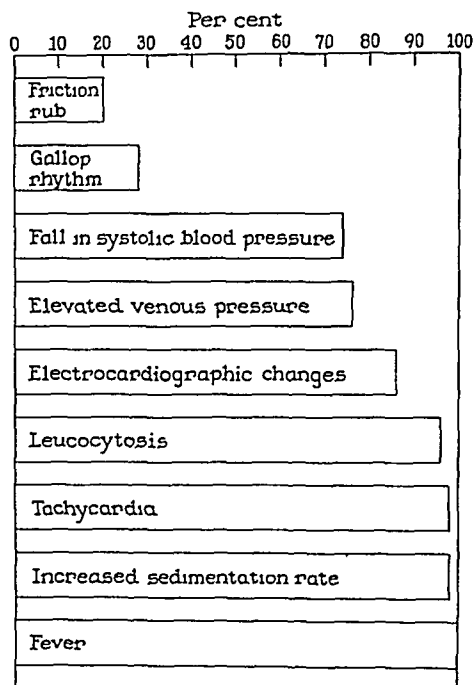


Chart 1.—Average incidence of various signs in 50 cases of cardiac infarction.

residents and members of the visiting staff, it is unlikely that a rub, if present and audible, was overlooked. Gallop rhythm was noted in 28 per cent. These two signs were the least common. A fall in systolic pressure occurred in 74 per cent, elevation of venous pressure in 76 per cent, significant changes in the form of the electrocardiogram in 86 per cent, leukocytosis in 96 per cent, tachycardia in 98 per cent, increase in sedimentation rate in 98 per cent. Fever was recorded in every instance (100 per cent).

TIME OF APPEARANCE AND DURATION
OF FOUR SIGNS

In chart 2 are shown the average pulse rates, temperatures, sedimentation rates and leukocyte counts of 20 patients admitted to the hospital on the first day of illness and under observation there for at least a month. The highest heart rates recorded in individual cases ranged from 78 to 132. The average rate was increased at once and reached its maximum of 97 on the third day. From then on it gradually fell and on the eleventh

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1. Westergren, A.: The Technic of the Red Cell Sedimentation Reaction. *Am Rev. Tuberc.* 14: 94 (July) 1926.

2. Moritz, F., and von Tabora, D.: Ueber eine Methode beim Menschen den Druck in oberflächlichen Venen exakt zu bestimmen. *Deutsches Arch. f. Klin. Med.* 98: 475 (Feb. 16) 1910.

3. Wilson, F. N.: The Electrocardiogram in Diseases of the Coronary Arteries, Diseases of the Coronary Arteries and Cardiac Pain, edited by R. L. Levy. New York, Macmillan Company, 1936.

day it was normal. There were two subsequent small peaks. The first of these, on the thirteenth day, may have been due to the raising of the patients on several pillows at about this time. The second increase in rate, which occurred on the nineteenth and twentieth days, was very slight and unexplained.

The average temperature was normal on admission and became elevated in the course of the next twenty-four hours, reaching 101.3 F. on the second day. The peak of fever was reached on the third day, when the temperature was 101.7 F. There was gradual deferescence, with return to normal on the eighth day. Thereafter the temperature tended to be subnormal. The range of highest temperatures in the individual cases was from 99.8 to 105 F.

The leukocyte count was elevated on the first day, the average being 12,800. It reached its maximum of 14,600 on the second day. It then fell and on the sixth day was normal and remained so. The highest counts in the individual cases ranged from 8,700 to 27,000 per cubic millimeter.

was suffering from a first attack or from one of a series. The eighth patient had a second attack of coronary occlusion four months after leaving the hospital and a third attack five years later, from which he recovered. He subsequently died at home; the final cause of death is not known.

COMMENT

The incidence of pericarditis has varied greatly in different series of cases which have come to necropsy. An average of four such series, compiled by Blumer,⁴ gave 21 per cent. Stewart and Turner,⁵ on the other hand, in 60 cases examined post mortem, reported evidence of pericardial involvement in 80 per cent. In our group a pericardial friction rub was heard in one fifth of the cases. If audible, it is helpful in diagnosis; failure to hear it does not exclude the diagnosis of cardiac infarction, or indeed, the presence of pericarditis.

Gallop rhythm indicates that the heart muscle has been damaged and is functioning poorly. It was relatively uncommon and of no great diagnostic importance.

Its persistence increases the gravity of the prognosis.⁶ A gallop was heard in 8 cases, in 1 of which death occurred in three days and in another case in three months.

A fall in systolic pressure usually occurred early, though sometimes delayed for twenty-four hours. It was not invariably observed, being absent occasionally when the infarct was small and the degree of shock slight. The range of fall in individual cases was from zero to 115 mm. of mercury.

The venous pressure of 33 patients was determined. It was elevated in 24. In 14 of these (58 per cent) there was clinical evidence of congestive failure; 4 patients were moribund when the reading was high. In every instance but 1 the elevation was noted during the first week. In 6 the level was 200 or over.

The range of elevation was from 103 to 310 mm. of water. Master and his collaborators⁷ found evidence of heart failure in 66 per cent of their cases.

Serial electrocardiograms were made in 49 cases. In 40, in addition to the standard limb leads, a precordial lead (4F) was taken. In 1 patient who died soon after admission no record was made, but necropsy confirmed the diagnosis. Of the 86 per cent in which characteristic changes were observed, 43 per cent were of the type indicating anterior infarction, 37 per cent were of the posterior type and 6 per cent were of the mixed type. There was a small group (14 per cent) in which no modifications in form occurred which were diagnostic of infarction. Changes in the electrocardiogram may continue to take place for many months, long after the area of infarction has healed.

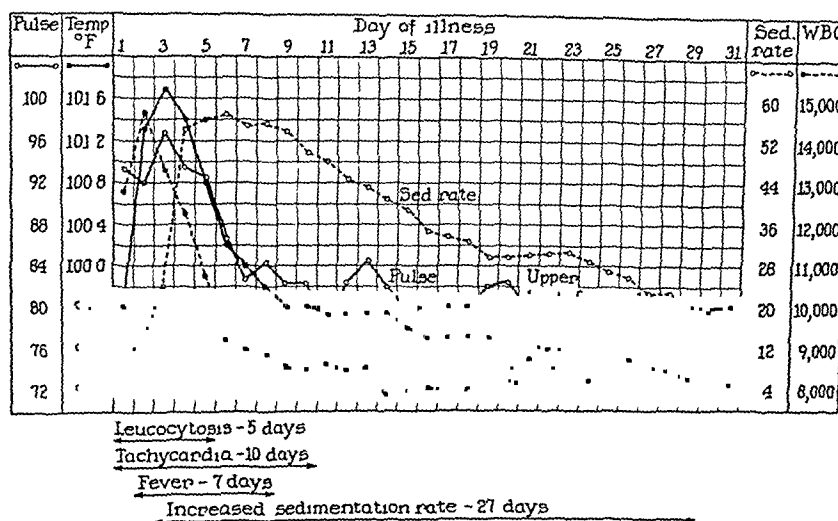


Chart 2.—Correlation of average pulse rates, temperatures, sedimentation rates and leukocyte counts in 20 cases of cardiac infarction in which admission to the hospital occurred on the first day of illness and observation was continued for one month.

The increase in sedimentation rate was the last of the signs to appear and also the one which persisted longest. There was a slight increase on the third day, with the maximum from the fourth to the eighth day. From then on there was a gradual fall, with a return to normal on the twenty-eighth day. The range of highest sedimentation rates in the individual cases was from 21 to 137.

THE RELATION OF CERTAIN SIGNS TO PROGNOSIS

Shortly after an attack of coronary occlusion has occurred, it is difficult to predict the outcome. The patient who appears to be gravely ill may recover; conversely, at any time, and particularly during the first two weeks, in spite of an apparently benign course, death may come suddenly. Three guideposts to prognosis have become apparent in the course of this study. Seven of 8 patients who showed either a rectal temperature above 104 F., a leukocyte count higher than 25,000 or a venous pressure over 200 mm. of water died within sixteen days after onset of the illness. In 5 of these, necropsy was performed. The occurrence of any one of these signs appeared to be of grave prognostic significance, regardless of whether the patient

4. Blumer, George. Pericarditis Episternocardica, J. A. M. A. 107: 178 (July 18) 1936.

5. Stewart, C. F., and Turner, K. B.: A Note on Pericardial Involvement in Coronary Thrombosis, Am. Heart J. 15: 232 (Feb.) 1937.

6. Thompson, W. P., and Levine, S. A.: Diastolic Gallop Rhythm: A Note on Certain Factors Influencing Prognosis, Am. Heart J. 11: 127 (Feb.) 1936.

7. Master, A. M., Dack, Simon, and Jaffe, H. L.: Coronary Thrombosis. An Investigation of Heart Failure and Other Factors in Its Course and Prognosis, Am. Heart J. 13: 339 (March) 1937.

Leukocytosis occurred early and disappeared in the course of the first week. It was a fairly constant sign but was sometimes absent when the infarct was small.

Tachycardia occurred in every case except 1, in which there was complete heart block.

An increase in the sedimentation rate of the red blood corpuscles appears to be a reliable index of infarction and affords a valuable guide with respect to the rate of healing of the lesions in the heart.⁸ In 1 case in which the sedimentation rate was not increased, the diagnosis was based largely on characteristic changes in the form of the electrocardiogram. There was no fever, the heart rate never rose above 84, and the highest leukocyte count was 9,900. The blood pressure did not fall. The sedimentation rate on the fifth day reached 20 mm. It seems probable, though it is unproved, that in this case there was occlusion of a small coronary branch without the formation of an infarct. The case is mentioned to illustrate this point. In 1 case in which death occurred twelve hours after the attack, the sedimentation rate on admission to the hospital was 4 and four hours later was 21 mm. Sufficient time did not elapse for it to reach higher levels.

The fact that fever was observed in every case stresses its diagnostic importance. Too often the temperature is taken by mouth or is not recorded at frequent intervals during the first few days. A chart of the rectal temperatures should be kept from the onset in any case in which coronary occlusion is suspected.

There were 16 cases not included in the 50 here reported in which there was a history of pain in the chest and other clinical features suggestive of recent cardiac infarction on admission to the hospital. The most common sign was change in the form of the electrocardiogram. In none of these was an increase in the sedimentation rate found during the first week. Chiefly because of this negative finding, all were treated as though infarction had not occurred. Follow-up showed that 10 patients were "well" after one month or longer. In 3, paroxysmal cardiac pain recurred when they were ambulatory. One proved to have disease of the gallbladder. Two later died and necropsy was performed; in neither case was healed or recent infarction present in the heart; one had hypertensive cardiovascular disease and the other aortic stenosis.

These observations lend support to the view that serial determinations of the sedimentation rate are useful in the differential diagnosis of anginal pain and cardiac infarction.⁹ The almost invariable increase in rate caused by infarction, and its persistence for weeks, enhance its value particularly in mild cases which are not seen during the first few days and in which fever and leukocytosis have disappeared. In advanced congestive heart failure the rate of sedimentation may not rise. It should be clearly understood also that, during the period when frequently repeated cardiac pain occurring at rest indicates impending coronary occlusion,¹⁰ no increase in sedimentation rate is to be expected. It is only after closure has occurred and the infarct has formed that the rate rises. In our experience the degree of increase in the sedimentation rate is not an index of the severity of the attack, nor is it helpful as a guide in foretelling the outcome.

8. Rabinowitz, M. A.; Shookhoff, Charles, and Douglas, A. H.: The Red Cell Sedimentation Time in Coronary Occlusion, *Am. Heart J.* 7: 52 (Oct.) 1931. Shookhoff, Charles; Douglas, A. H., and Rabinowitz, M. A.: Sedimentation Time in Acute Cardiac Infarction, *Ann. Int. Med.* 9: 1101 (Feb.) 1936.

9. Risenman, J. E. F., and Brown, M. G.: The Sedimentation Rate in Angina Pectoris and Coronary Thrombosis, *Am. J. M. Sc.* 194: 392 (Sept.) 1937.

10. Feil, Harold: Preliminary Pain in Coronary Thrombosis, *Am. J. M. Sc.* 193: 42 (Jan.) 1937.

SUMMARY

1. In 50 cases of uncomplicated cardiac infarction an analysis was made of the incidence, time of appearance and duration of certain signs.

2. Increase in the sedimentation rate of the erythrocytes was observed in all but 1 instance. Fever occurred invariably. Other signs were less frequently present.

3. A rectal temperature above 104 F., a leukocyte count higher than 25,000 or a venous pressure over 200 mm. of water indicated a grave prognosis. Seven of 8 patients showing any one of these signs died within sixteen days after the coronary attack.

4. The level of the sedimentation rate is helpful in the differentiation between anginal pain and cardiac infarction. It is of particular value in cases of infarction with mild symptoms which are not seen by the physician during the first few days of illness. The degree of increase is not an index of the severity of the attack nor does it serve as a guide in prognosis.

PULMONARY TULAREMIA

A DISCUSSION OF THE DISEASE AS A CLINICAL ENTITY, WITH REPORT OF THREE CASES

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The earliest papers on pulmonary tularemia as a clinical entity were published in 1931-1932.¹ In 1935 Blackford² published one of the first clinical reports on this aspect of the disease. It was followed by a review of the literature up to 1936 of tularemia pneumonia by Sloan, Freedberg and Ehrlich.³ In 1937 Winter, Farrand and Herman⁴ collected all the published cases of pulmonic tularemia and tabulated some of the essential data. Blackford and Casey⁵ have recently published a good review of this subject.

In reviewing the literature on pulmonic tularemia we have been impressed with the lack of clinical recognition of the pulmonic form of the disease. In a large proportion of the reported cases an incorrect diagnosis or no diagnosis was made, as in our first case. Pessin⁶ collected from the literature some thirteen different diagnoses which were wrongly made in proved cases of fatal tularemia. We are able to add several more.

This difficulty in recognition is somewhat surprising in view of the apparent frequency with which pulmonary lesions occur in tularemia. Foshay's collected data⁷ show that pulmonary consolidations were found in 107 of 600 cases of tularemia, while pleurisy occurred in 56 and pleural effusions in 18. Blackford² found that in 33 of 35 cases of tularemia there were abnormal bronchopulmonary manifestations revealed by roentgen examination and in 7 there was frank pneumonia. Kavanaugh reported that 16 of 123 patients with tularemia

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1. Blackford, S. D.: Pulmonary Lesions in Human Tularemia, *Ann. Int. Med.* 5: 1421 (May) 1932. Sante, L. R.: Pulmonary Infection in Tularemia: Case Report, *Am. J. Roentgenol.* 25: 241 (Feb.) 1931. Permar, H. H., and MacLachlan, W. W. G.: Tularemia Pneumonia, *Ann. Int. Med.* 5: 687 (Dec.) 1931.

2. Blackford, S. D.: Pulmonary Manifestations in Human Tularemia, *J. A. M. A.* 104: 891 (March 16) 1935.

3. Sloan, L. H.; Freedberg, A. S., and Ehrlich, J. C.: Tularemia Pneumonia, *J. A. M. A.* 107: 117 (July 11) 1936.

4. Winter, M. D.; Farrand, B. C., and Herman, H. J.: Tularemia, Pulmonary Form, *J. A. M. A.* 109: 258 (July 24) 1937.

5. Blackford, S. D., and Casey, C. J.: Pleuropulmonary Tularemia, *Arch. Int. Med.* 67: 43 (Jan.) 1941.

6. Pessin, S. B.: Tularemia Pneumonia, Pericarditis and Ulcerative Stomatitis, *Arch. Int. Med.* 57: 1125 (June) 1936.

7. Foshay, Lee: Tularemia: A Summary of Certain Aspects of the Disease Including Methods for Early Diagnosis and the Results of Serum Treatment in Six Hundred Patients, *Medicine* 10: 1 (Feb.) 1940.

had pneumonia and 3 had pleural effusions.⁸ Blackford and Casey⁹ made a clinical diagnosis of tularemic pneumonia in 20 of 95 patients with tularemia and 13 of these had pleural fluid.

The pathologic condition of human tularemia has been adequately described and is well understood. It



Fig. 1 (case 1).—Appearance on Jan. 24, 1940.

is essentially a necrotizing process which causes areas of focal necrosis. These may be small, as in the liver or spleen, or large, as in pulmonary abscesses and cavitation. In addition, the disease seems to have a predilection for the lymphoid tissue either locally or generally. Gundry and Warner¹⁰ summarized the autopsies reported in the United States in 1934. Bernstein,¹¹ Lillie and Francis¹² and Pessin⁶ brought this summary up to date in 1935 and 1936. According to Blackford and Casey,⁵ there are about 56 necropsy reports in the literature. Foshay⁷ gave a general review of tularemia which contains a summary of data from a large number of cases collected by him and an extensive bibliography.

Tularemia may occasionally occur in such obscure form that it is recognized with difficulty. During a period of six months we have had an opportunity to observe and study 3 cases of this kind. In the first case the diagnosis was not made until the time of autopsy, but that experience led us to suspect the correct diagnosis at a relatively early stage in the last 2 cases. These 3 cases are similar in certain respects and represent the pulmonic form of tularemia.

REPORT OF CASES

CASE 1.—History.—R. P., a white schoolboy aged 18, admitted to the hospital Jan. 22, 1940, complained of chills and fever and pain in the right side.

Six days before admission he had experienced a severe frontal headache and a pain in the interscapular region of the back described as severe and aching and lasting for one or two days. He kept on going to school but did not feel well.

8. Kavanaugh, C. N.: Tularemia, *Arch. Int. Med.* 55:61 (Jan.) 1935.

9. Gundry, L. P., and Warner, C. G.: Fatal Tularemia: Review of Autopsied Cases with Report of a Case, *Ann. Int. Med.* 7:837 (Jan.) 1934.

10. Bernstein, Alan: Tularemia: Report of Three Fatal Cases with Autopsies, *Arch. Int. Med.* 56:1117 (Dec.) 1935.

11. Lillie, R. D., and Francis, Edward: Pathology of Tularemia, National Institute of Health Bulletin 167, United States Treasury Department, Public Health Service, 1936.

January 18 he experienced pain in the right lower portion of the chest which was made more severe on deep inspiration, at which times it would be sharp and knifelike. That day he had a chill and a temperature of 104 F. He felt much worse and was forced to go to bed. The pain in the right side of the chest continued up until admission to the hospital.

During the three days before entry to the hospital he had five chills, and his temperature was as high as 103 to 104 F. It was noticed that he was becoming drowsy and at times delirious. He occasionally became nauseated and vomited. On January 19 he had sudden severe pain in the midepigastrium which radiated straight through to the spine and which gradually diminished and disappeared during the succeeding forty-eight hours. His local physician gave him sulfanilamide for forty-eight hours before admission. January 21 he appeared much worse. It was noticed that he was breathing rapidly, and on this day he had a sudden severe, constant pain in the right flank and in the right upper quadrant of the abdomen. This pain did not radiate and persisted until after admission. His mother stated that for several weeks prior to the onset of this illness he had not seemed to be entirely well but had no specific complaints, except that he seemed drowsy, lethargic and weak and had stopped eating breakfast, which was unusual for him. He had no cough prior to admission to the hospital.

On January 12 (four days before onset of the acute illness) he went rabbit hunting and killed and skinned a rabbit. No ulcer or cutaneous lesion of any kind had been noted following this. There was no history of an insect bite.

Examination.—The patient appeared critically ill, was rational, could answer questions but was not entirely clear mentally. He was slightly cyanotic. (This may have been due in part

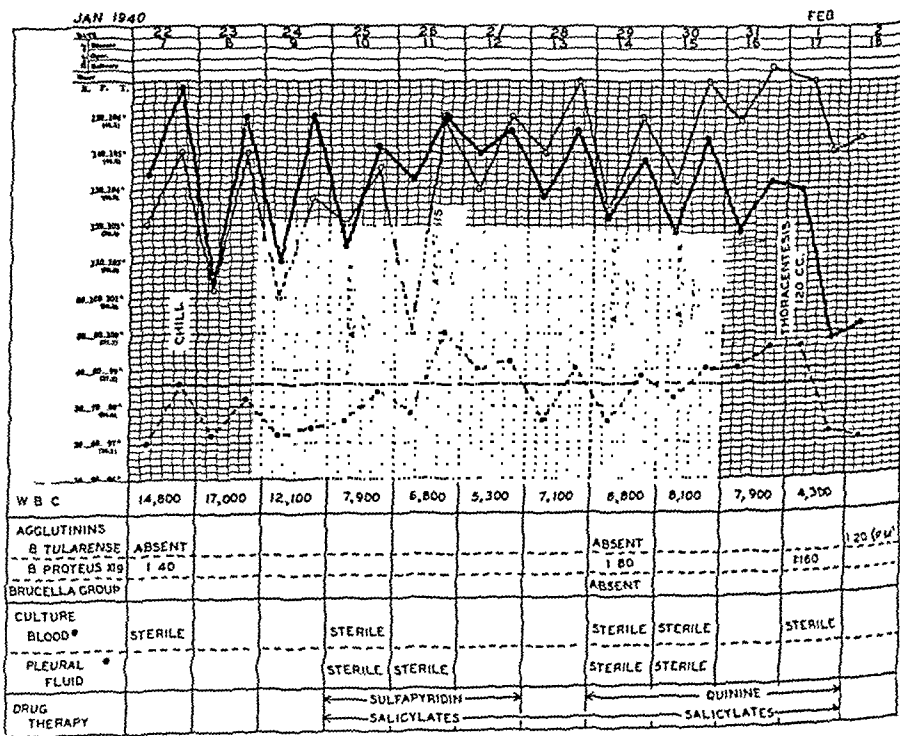


Fig. 2 (case 1).—Curves of maximum and minimum daily values of temperature (heavy line), pulse (light line) and respiration (broken line). The important laboratory data and some of the therapeutic procedures are given.

to the sulfanilamide he had received.) His breathing was slightly rapid. The skin was hot and dry; no cutaneous lesions of any kind were found. There was definite stiffness of the neck, but this was not severe. Several small (1 to 2 mm.) hemorrhagic areas were seen on the soft palate and uvula. Lymph glands of all the superficial groups were palpable except the epitrochlear on one side. They were small, with the exception of one axillary which was moderately enlarged but not tender. There was a slight lag of the right lower portion of the chest on inspiration and slight dullness at

the base of the right lung posteriorly but no rales were present. Both sides of the diaphragm moved well, and this was confirmed by fluoroscopic examination. The heart beat was rapid and regular and there were no murmurs. The blood pressure was 132 systolic and 70 diastolic. There was well defined tenderness all across the upper part of the abdomen, especially



Fig. 3 (case 1).—Appearance on Jan. 27, 1940.

of water. Roentgen examination of the chest on the day of admission showed a general haziness over the entire right lung, interpreted as slight pleural thickening (fig. 1). Surgical consultants, requested because of the pain in the abdomen and right flank, were of the opinion that surgical disease was not present. The course was stormy; he gradually became very drowsy and at times irrational. During the first few days in the hospital typhus fever, typhoid or paratyphoid fever, localized abscess in the perinephric or hepatic region and virus pneumonia were considered as possible diagnoses. On the tenth day of his illness there were signs suggestive of fluid in the right pleural cavity. Thoracentesis was done, but only about 1 cc. of fluid could be obtained. On smear this fluid contained a few questionable small gram-negative organisms, but their importance was discounted because routine culture of this fluid was sterile. Subsequently every one or two days thoracentesis yielded varying amounts of pale yellow, slightly cloudy fluid from the right pleural cavity (fig. 2). It contained from 1,100 to 2,400 white cells per cubic millimeter, of which about 72 per cent were granulocytes, 10 per cent lymphocytes and 2 per cent monocytes and the remainder was undifferentiated.

Roentgenograms of the lungs at frequent intervals showed a general increasing haziness over the right lung with a small area of pneumonia near the hilus in the left lung which did not increase in size (fig. 3). His spleen became palpable on the twelfth day of his disease and remained so till death. Sulfapyridine was given for forty-eight hours but caused no noticeable change in his course. On the eighth hospital day acute rheumatic fever, chronic malaria and miliary tuberculosis were added to the list of possible diagnoses. Sodium salicylate and quinine were given for four days each without influencing the course of the disease. A mild secondary anemia developed which was treated by repeated small transfusions.

The last few days of his life he became delirious and unresponsive and had to be fed through a stomach tube. His temperature began to drop eighteen hours before death, he became comatose and he died quietly on the eighteenth day of his illness.

Autopsy.—There was fluid in each pleural cavity. The pleural surfaces on the right side were covered by a thin layer of yellow friable exudate. The pleuras on the left were normal. At the base of the right lung posteriorly and over the right diaphragmatic surface the exudate was thicker and was beginning to undergo organization. Most of the right lung was consolidated, with the exception of the lower lobe, which was collapsed. On section this appeared to be a "nodular, fibrino-

caseous pneumonia." At the apex there was an area of necrosis 2 by 3 cm. The left lung contained no consolidation but in the lower lobe there was an irregular area of necrosis 3.5 cm. in diameter. The hilar lymph glands were slightly enlarged and several had caseous centers. The liver weighed 2,200 Gm. and on section contained many areas of necrosis. The spleen was enlarged (410 Gm.) and contained many tiny necrotic areas. The other organs, including the brain, were essentially normal. *Pasteurella tularensis* was isolated and identified from material obtained at autopsy by guinea pig inoculation and agglutination with specific serums by Dr. John Buddingh of the pathology department.

CASE 2.—History.—Mrs. A. W., a housewife aged 43, entered the hospital July 20, 1940 with an acute febrile illness of eleven days' duration.

Except for a slight hacking cough of about three months' duration, she had been in good health until one month before admission, at which time she had the onset of malaise, lassitude and occasional shooting pains across the chest anteriorly. About one week later she had symptoms of a respiratory infection beginning with a running nose and a hacking, nonproductive cough which was later productive of small amounts of thick mucoid and pale yellow sputum which had not been blood tinged except once the day before admission. She had a headache which began eighteen days before admission.

On July 9 these symptoms changed abruptly to those of an acute illness. She had a sensation of chilliness followed by high fever, and the next day she had a hard shaking chill. She experienced fever daily until admission, once as high as 105 F., but had experienced no chills for five days prior to admission. On July 17 her husband noticed some difficulty in her breathing, especially during expiration, which he described as a "rattling in her chest." She was disoriented frequently and delirious occasionally.

There was no history since Christmas of contact with a rabbit except a pet wild rabbit which had been caught in a field when a few days old and kept in a nearby barn. It had died about three weeks before her illness began. While the patient was alive her husband maintained that she had experienced no insect bites. However, on the day of her death he did recall having seen a tick on the back of her neck a few days before her illness began and presumably had removed it. He did not recall whether it was feeding.

Examination.—The patient was extremely drowsy but could be aroused and appeared to be critically ill. Breathing was rapid and noisy and expiration suggested a partial obstruction to the outward passage of air. She coughed occasionally and raised a small amount of blood tinged mucoid sputum. There was a distinct cyanotic tint of the nail beds and lips. She was obese. No lesions were found on the skin. General enlargement of the lymph glands was not present. There was exquisite tenderness over the left maxillary sinus. Examination of



Fig. 4 (case 2).—Appearance on July 20, 1940.

the fundi showed slight venous congestion; the temporal margins of the optic nerve heads were slightly hazy. There was slight rigidity of the neck and a questionable Kernig's sign was present. Abnormal signs in the lungs were limited to the left lung. There was hyperresonance to percussion anteriorly and in the axilla, but posteriorly the percussion note was dull. Many coarse rhonchi were scattered throughout both lungs and aeration seemed diminished over the entire left lung.

Tactile fremitus was normal. The heart was normal except for the rapid rate. Blood pressure was 130 systolic and 90 diastolic. The abdomen was distended with gas. The liver and spleen were not palpable or enlarged by percussion. Reflexes were hypoaactive but equal. The plantar reflex was normal on the left side but a questionable Babinski sign was

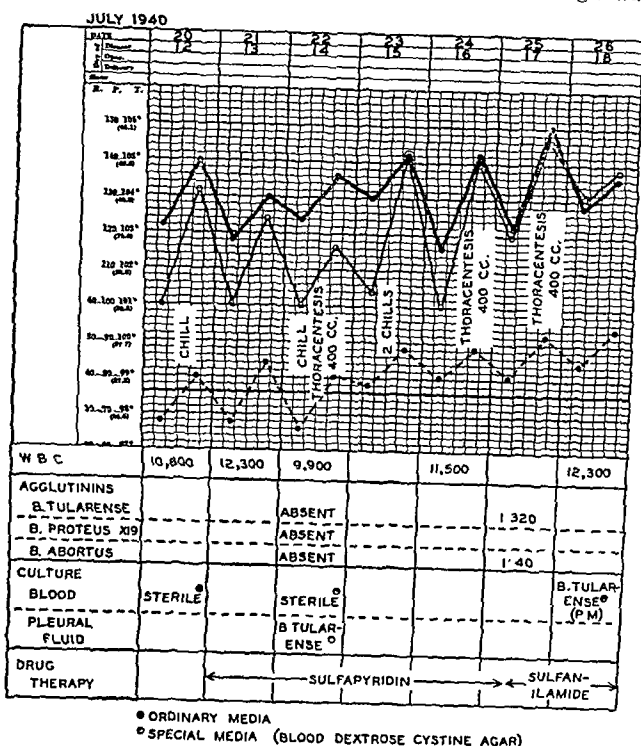


Fig. 5 (case 2).—Curves of maximum and minimum daily values of temperature, pulse and respiration. The important laboratory data and some of the therapeutic procedures are given.

present on the right. Muscle strength was diminished and there was a generalized tremulousness. The motor parts of the cranial nerves were normal.

A blood study showed 10,800 white cells with 80 per cent neutrophils, 2 per cent eosinophils, 14 per cent lymphocytes and 4 per cent monocytes. There was no anemia. She coughed up small amounts of tenacious mucoid sputum which was blood tinged and contained gram-positive diplococci. These appeared to be pneumococci but they would not give the quellung reaction with any type specific serums. Acid fast bacilli were not found. Catheterized urine contained a trace of albumin and a trace of sugar but was otherwise normal. A specimen of the stool was black and watery but contained no hemoglobin and no parasites.

Roentgenograms of the chest with portable apparatus showed a normal right lung. There was general haziness over the left lung which was interpreted as thickened pleura. Underlying this there was a scattered, irregular infiltration suggesting bronchopneumonia. The mediastinal shadow was wide (fig. 4). An interpretation of tumor or mediastinal pleurisy was suggested by the roentgenologist.

In view of this it was felt that she had some kind of tumor of the mediastinum or bronchus which was causing partial obstruction and that pulmonary infection was present distal to the point of obstruction. Sulfapyridine therapy was started the morning of the second day and continued until the day before death (total of four and one half days). Blood levels of effective sulfapyridine were 11 and 16 mg. per hundred cubic centimeters on the third and fourth days of drug therapy. Her course for the first few days was slowly down hill. Stool culture showed no organisms of the typhoid-dysentery group.

Agglutinations with her serum on the fourteenth day of the acute febrile illness against typhoid, paratyphoid A and B, Brucella abortus, Proteus X19 and tularensis organisms were all negative.

On the third hospital day there were signs of fluid in the left pleural cavity and 425 cc. of slightly cloudy, pale yellow fluid was removed by thoracentesis. This pleural fluid led us to suspect pulmonic tularemia. The fluid had a specific gravity of 1.022 and contained 5,250 white cells per cubic millimeter, of which 82 per cent were polymorphonuclear cells, 10 per cent were lymphocytes and 8 per cent were unclassified. A smear of the fluid showed pleomorphic gram-positive bacilli. This fluid was placed on ordinary mediums for culture but produced no growth. It was also placed on blood dextrose cystine agar and inoculated intraperitoneally in a white mouse and from both of these *Pasteurella tularensis* was isolated and identified. Fluid was removed from the left pleural cavity on two subsequent occasions (fig. 5). It had the same general characteristics as the first except that the last specimen, removed the day before death, contained 7,000 white cells per cubic millimeter.

She became rapidly worse, slipped from drowsiness into semicoma and died in a comatose state on the eighteenth day of the acute febrile illness.

Autopsy.—The left pleural cavity contained a large amount of fluid. Thin fibrinous strands of exudate loosely joined the visceral and the parietal pleura. The surface of the left lung was covered with a thick, greenish, fibrinous exudate, and at the apex a thick fibrous adhesion was found. The left lung was firm to palpation and almost completely consolidated. On cut section the entire lung, except for a few patchy areas, appeared to contain a gelatinous bronchopneumonia which on section was lobular. There was a small infarction in the lower lobe 1.5 cm. in diameter. The right lung was normal except for a small area of consolidation in the lower lobe and a fibrous adhesion at the apex.

The mediastinal, hilar and bronchial lymph glands were greatly enlarged. Several measured 3 by 1 cm. and just above the bifurcation of the trachea there was a group of nodes measuring 6 by 2 cm. The cut surface of these glands showed areas of necrosis. The hilar nodes were larger on the left side but an actual compression of a bronchus was not demonstrated. Two nodes were embedded in the pericardium, which was otherwise normal. The heart and peritoneum were normal. The liver was enlarged (1,890 Gm.) and scattered over its surface were small areas of necrosis 1 to 2 mm. in diameter. The spleen was enlarged (380 Gm.) and soft and there were a few fibrous adhesions present between its tip and the diaphragm. Cut surface showed many tiny areas of focal necrosis. Other organs, including the brain, were normal. *Pasteurella tularensis* was isolated from material obtained at autopsy by Dr. John Ransmeier.

CASE 3.—History.—Miss Z. S., aged 19, white, was admitted to the wards Sept. 2, 1940 with an acute febrile illness of seven days' duration.

The girl was so ill at the time of admission that the history was obtained mainly from her family. She had apparently been in good health until August 26, at which time she complained of "drowsiness and tiredness."

August 27 she became more drowsy and began to have fever, malaise and headache. During the following week she remained in bed, continued to have fever which became gradually higher and had several chilly sensations but no shaking chills. She complained of an aching type of pain in the left upper part

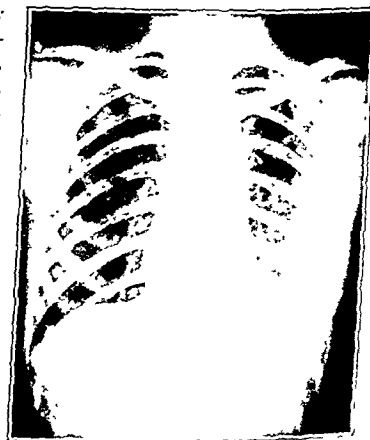


Fig. 6 (case 3).—Appearance on Sept. 2, 1940.

of the abdomen and experienced occasional attacks of pain across the anterior part of the chest and in the left axilla.

August 31 it was noticed that she was breathing faster than usual, that she began to have irregular gross twitching movements of the hands and arms and occasionally was "talking out of her head." Two days before admission her speech became

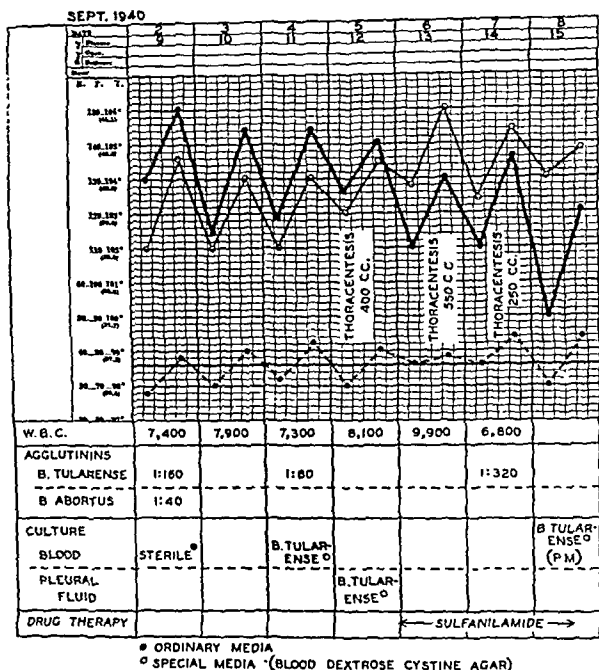


Fig. 7 (case 3).—Curves of maximum and minimum daily values of temperature, pulse and respiration. The important laboratory data and some of the therapeutic procedures are given.

"thick" and slurred. All these symptoms continued up until admission. There was no history of any insect bites or of any kind of contact with rabbits.

Examination.—The patient was poorly developed and poorly nourished and was critically ill. She was very drowsy but could be aroused. At times she was semidelirious. Breathing was shallow and rapid and somewhat labored. No cutaneous lesions of any kind were found. There was no general enlargement of the lymph glands but small epitrochlear and axillary glands were palpable on each side. The conjunctivas were inflamed. Optic nerve heads were slightly elevated and were hazy in outline. Mucous membranes of the mouth were reddened. There was a gross tremor of the protruded tongue and slight but definite stiffness of the neck. The lungs showed signs of a high diaphragm on the left side but otherwise they were normal. The heart beat was rapid; P_2 was split; no murmurs were heard. The blood pressure was variable but was about 120 systolic and 80 diastolic. There was a good deal of voluntary guarding when the abdomen was palpated. Some generalized tenderness was present. The liver and spleen were not palpable or enlarged by percussion. There was definite muscular weakness of all extremities, especially of the arms. Reflexes were normal with the exception of the left plantar response, which was Babinski in type.

A blood study showed 7,400 white cells, with a differential count of 74 per cent granulocytes, 18 per cent lymphocytes and 3 per cent monocytes. The urine contained 1 plus albumin but was otherwise normal.

Diagnoses considered at the time of admission were typhoid, encephalitis and poliomyelitis. Lumbar puncture on the day of admission showed normal spinal fluid under normal pressure.

Roentgenograms of the chest on the day following admission showed the diaphragm high on the left and a general haziness over the left lung; no consolidation was present (fig. 6). For the next few days she continued to be critically ill. She

was irrational most of the time but would occasionally respond to questions. A queer gross tremor of the arms developed which was rhythmic at times and suggestive of the type seen in Parkinson's disease. Her neck remained stiff. The spinal fluid was examined twice more and was normal.

On the fourth hospital day signs of fluid in the left pleural cavity developed and 400 cc. of slightly cloudy orange fluid was removed by thoracentesis. This had a specific gravity of 1.012 and contained 2,400 white cells, of which 60 per cent were polymorphonuclears and 40 per cent lymphocytes. No bacteria were seen on smear.

The diagnosis of tularemia was suggested by this accumulation of pleural fluid. Reaccumulations of pleural fluid, always on the left side, were removed two additional times (fig. 7), once 550 cc. and once 250 cc., and each time the fluid had approximately the same characteristics. Culture of this fluid on special mediums (blood dextrose cystine agar) yielded *Past. tularensis*. On the fourth hospital day roentgenograms of the chest showed some consolidation at the base of the left lung (fig. 8).

Sulfanilamide was started on the fifth hospital day. Her respirations became more rapid, she became cyanotic and comatose and was put in an oxygen tent, but we were unable to alter the course of her disease and she died on the fifteenth day of the disease.

Autopsy.—Fluid was present in each pleural cavity. There was a thick fibrinopurulent exudate covering the entire surface of the left lung, and in some areas the lung was loosely adherent to the chest wall and to the diaphragm. The surface was a grayish green with red mottling. The lung was firm and on cut section showed a lobular consolidation. There was a cavity 2 by 1 cm. in the upper lobe containing greenish necrotic material, and near the apex several tiny areas of necrosis were present. The upper and middle lobes of the right lung were adherent to the chest wall by numerous thin fibrous bands. The cut surface appeared congested but showed no consolidation. Hilar and tracheal lymph glands were moderately enlarged. They appeared in clusters, the largest gland measuring 2 by 1 cm. The mesenteric and lumbar nodes were also moderately enlarged. The liver was slightly enlarged (1,270 Gm.). It contained no areas of necrosis but on section three small adenomas were found. The spleen (260 Gm.) had scattered areas of focal necrosis from 2 to 4 mm. in diameter.

The remaining organs were normal except for small focal areas of necrosis in the ovaries and bone marrow similar to those seen in tularemia. Permission to examine the brain was not obtained. At autopsy material was obtained from which *Past. tularensis* was isolated by Dr. John Ransmeier, using special mediums.

COMMENT

The clinical appearance of these 3 patients had certain similarities. They all had a severe febrile illness, associated with a "typhoidal" mental state, pain in the chest or upper part of the abdomen, signs of pulmonary disease and a pleural effusion. They had no ulcers or superficial sites of infection in the skin. Specific laboratory evidence for the diagnosis of tularemia was lacking until late in the illness, except when special culture mediums were used.

The difficulty in diagnosis in these 3 cases was that there was no clue to the etiologic agent, although the



Fig. 8 (case 3).—Appearance on Sept. 5, 1940.

patients were desperately ill. None of these 3 patients had a tularemic ulcer. This is not unusual in pulmonary tularemia, for in a series of 46 cases collected from the literature 21 presented no ulcer.⁴ Blackford² has emphasized the difficulty in diagnosis in some cases and states that it has been his custom to measure the serum agglutination for *Past. tularensis* in all unusual pulmonary lesions, since several unsuspected cases have been discovered by him in that way.

The most reliable method of diagnosis, excepting culture of the specific organism, is the agglutination test, which Foshay⁷ and Francis¹² point out is almost infallible after the second week. In their experience specific agglutinins always appear during the second week of the disease. However, this occasionally fails. In case 1 agglutinins for *Past. tularensis* were absent on the fourteenth day of the disease and on the eighteenth day agglutinins were present only in a dilution of 1:20, which is certainly not diagnostic. In case 2 specific agglutinins were absent on the fourteenth day of the disease but on that day *Past. tularensis* was cultured from the pleural fluid. The agglutination test was positive on the seventeenth day (fig. 5). In case 3 the agglutination test was not diagnostic, since it fell from 1:160 on the ninth day to 1:80 on the eleventh day of the disease, at a time when *Past. tularensis* was cultured from the blood and pleural fluid (fig. 4).

In the current classifications of tularemia the pulmonary form has been omitted as a primary type. Foshay considers pneumonia more as an integral part of the disease than as a complication.

As one becomes more familiar with tularemia one probably will come to use the same kind of anatomic-etiological type of diagnosis that is being now used in many other infectious diseases. The terms tularemic pneumonia, tularemic pleuritis, tularemic lymphadenitis, tularemia of the skin and tularemic meningitis should be used and the awkward nomenclature ulceroglandular and oculoglandular dispensed with.

From a study of the cases presented here and those published previously, we believe that pulmonary tularemia is sufficiently clearcut to be a disease entity and sufficiently common to deserve more emphasis than it has received in the past. It should be pointed out that the criteria used in making the diagnosis of tularemia in some of the published results are not entirely acceptable. Occasionally it is difficult to prove, without culturing the organism, that a pulmonary lesion is tularemic.

The symptoms of pulmonary tularemia are variable. On the whole there are two groups of cases: The disease may begin with pulmonary symptoms or the pulmonary infection may develop during the course of another type of tularemic infection.

In one group of cases pulmonary symptoms initiate the disease and usually begin with cough, fever, malaise and occasionally chills. Many do not present cutaneous lesions and may be characterized by nothing more than a severe febrile illness with profound toxicity and drowsiness. Occasionally pleuritis may begin early (as in cases 1 and 3), attracting attention to the lungs. Pleuritic pain may be the dominating symptom. A number of cases of milder involvement, appearing as atypical pneumonia, have been discovered by the agglutination test. Several unusual cases have been recorded in which the disease was relatively mild and in which the pulmonary lesion lasted for months.

In another large group of cases pulmonary tularemia develops in patients having well recognized tularemia beginning with an ulcer or an infection of the eye. Later in the course of the disease pulmonary symptoms develop and are found to involve the lungs. These cases offer no problem in diagnosis. They may be of severe or mild involvement and do not differ essentially from the first group as far as the pulmonary disease is concerned. On the whole, judging from the cases reported, the sickest patients are most likely to have involvement of the lungs.

In practically all the severe cases extreme drowsiness or a "typhoidal" state develops. In obscure cases this is helpful because its appearance strongly suggests tularemia in the absence of typhoid or typhus fever.

Pleuritis is usually present in the cases of fatal tularemic pneumonia and it is probably safe to assume that it is present in most of the severe cases. At times it is extensive. Some cases which later on become pneumonic may begin with pleuritis, as in our cases. At times the pain associated with the pleuritis may be severe and if present in the upper part of the abdomen it may suggest an abdominal surgical emergency. In at least 1 case in which jaundice was also present an unnecessary abdominal operation was performed.¹³

A diagnostic sign of great value is the development of a pleural effusion. In cases 2 and 3 removal of pleural fluid enabled us to suspect strongly the correct diagnosis at a time before diagnostic bacteriologic and serologic evidence was available. The character of the fluid is usually similar to that described in the present cases. It is usually pale yellow, slightly cloudy fluid and never grossly purulent. The specific gravity is always higher than 1.017, according to Blackford and Casey,⁵ although in 1 of our cases it was 1.012. The total cell count is usually rather low, from 2,000 to 5,000 per cubic millimeter. Cell counts above 10,000 are unusual (Blackford and Casey⁵).¹⁴ The cells are predominantly polymorphonuclear leukocytes, the percentage varying from 60 to 82 per cent in our cases. The accumulations of pleural fluid are usually moderate in amount but may be large. In patients suspected of having tularemia, pleural fluid should be carefully watched for and removed for study as a diagnostic procedure.

It is our feeling that pleural fluid would be discovered and removed more often if its diagnostic importance was generally appreciated. Occasionally the organisms can be found by a gram stain of the fluid. In case 1 we observed what was probably *Past. tularensis*, but the organisms were rare and their presence was discounted when the routine culture of the fluid showed no growth. In case 2, the organisms were seen on stained smear without difficulty, but not in case 3.

A valuable procedure which has been added to the bacteriologic routine of this clinic by Dr. John Ransmeier is the use of blood dextrose cystine agar medium in suspected cases of tularemia. We have found this special medium extremely useful in proving several difficult cases (not reported here) by culturing the organisms from the blood or pleural fluid. Experience with this medium is reported elsewhere.¹⁵

13. Verbruycke, J. R., Jr.: Tularemia, with Report of a Fatal Case Simulating Cholerae with Postmortem Report, *J. A. M. A.* 82:1577 (May 17) 1924.

14. In a case of pulmonary tularemia recently seen by us L. A. R. reported here, the cell count of the pleural fluid was 20,000 per cubic millimeter.

15. Ransmeier, J. C., and Schaub, Isabelle G.: The Direct Cultivation of Bacterium Tularemiae from Human Blood Drawn During Life and at Autopsy, *Arch. Int. Med.* 68:747 (Oct.) 1941.

Cough is usually present in pulmonary tularemia but is not one of the dominating symptoms in most cases. Most commonly it is moderate, hacking and nonproductive. At times sputum is moderate in amount and mucopurulent. Infrequently it is blood tinged. Rarely large amounts of sputum have been reported in association with a large cavity or abscess.

In only 1 reported case has *Past. tularensis* been isolated from the sputum,¹⁶ but the organism has been demonstrated frequently from the pulmonary lesions at autopsy. Since McCoy's¹⁷ description of tularemia as a "plague-like disease of rodents," many clinicians have lost sight of the fact that tularemia has a great deal in common with plague. The morphology of the two organisms is very similar. Both diseases have animal reservoirs and insect vectors. Both diseases cause enlarged tender lymph glands ("bubonic" plague, "glandular" tularemia), which may later become necrotic and suppurate. In the course of the glandular type of each disease pneumonia and pleuritis may develop secondarily.¹⁸ Both diseases have a septicemic type and a pneumonic type. In plague the primary pneumonic type is well known and greatly feared. In tularemia the primary pneumonic type is not well known and there is some doubt about whether it occurs except with great rarity.¹⁹ The type of pulmonary consolidation in each is lobular and confluent.²⁰ As a mode of spread the sputum has never been considered important in pulmonic tularemia. This may be due to the relative infrequency of the disease. However, the incidence of pulmonary tularemia is increasing in this hospital, and from the published reports it is possible that it is increasing generally.

With the outlook of large collections of people in confined areas during the present war emergency, a situation enhancing the spread of respiratory diseases, it is well to consider the possibility of pulmonary tularemia appearing in epidemic form. So far no case has been reported in which the spread of the disease has been proved to be by way of the sputum, but under the proper conditions this is possible.

Physical signs of pneumonic tularemia depend on the type of lesion present. Two kinds of parenchymal pulmonary disease occur—pneumonic and necrotizing. The pneumonic consolidation is described as a confluent or lobular bronchopneumonia. This is usually patchy and involves small areas which coalesce as the disease advances. The disease also produces necrosis of the lung tissue resulting in small gangrenous areas, in cavities of various sizes or in abscesses of the lungs. The physical signs will, of course, vary according to the kind and extent of the lesion. In general, necrosis or cavitation of the lung tissue develops following pneumonia and occurs in those cases in which the disease is most severe. Some authors report that the heart rate is slow in relation to the elevation of temperature. This is frequently not observed, although it may be seen in the milder cases.

The white blood cell count is usually low in relation to the fever but is frequently from 10,000 to 14,000 per cubic millimeter.

The mediastinal and peribronchial lymph glands are almost always enlarged in pulmonary tularemia, sometimes to a striking degree. Symptoms caused by these glands compressing and partly obstructing the bronchi or the presence of an enlarged mediastinal shadow by roentgen examination have been reported only rarely (as in case 2). It seems to us that these complications should occur more frequently.

In considering the differential diagnosis of pulmonary tularemia, typhus fever, typhoid, atypical pneumonia, acute pleuritis from any cause and, in the more chronic cases, tuberculosis must be kept in mind.

SURGEON AND ANESTHETIST

THEIR MUTUAL RELATIONSHIP

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Operative surgery, as we know it today, is the product of the last seventy-four years, for it was conceived by the publication of Lister's¹ work in 1867. The surgeon himself, however, had long since won the respect and esteem of his colleagues to a degree which would have been inconceivable in the days of "physician apothecaries" and "barber surgeons." That he did so was probably due to the fact that the early surgeon was learned in anatomy and skilled in clinical observation. His colleagues recognized in him a man who had read widely, had observed carefully and had thought deeply. Therefore, even in days when any exhibition of his technical skill almost invariably resulted in a death from "hospital gangrene," his opinion was respected by his confrères. Thus, when the work of Semmelweis, Pasteur and Lister on infection and that of Long, Morton and Simpson on anesthesia had provided the prerequisites, the technical aspect of surgery—its operative practice—grew up rapidly and smoothly because it was a tool in the hands of men competent to use it.

In anesthesia, unfortunately, the reverse has been true. Morton's demonstration startled the medical profession in all countries, but not sufficiently, it seems, to have attracted the undivided attention of its keener minds. With the exception of a few such men as Snow and Hewitt the profession saw in anesthesia merely a technical advance ordained for the convenience of the surgeon. It is strange that medical men should have regarded so lightly the production of a state which closely simulates impending death and greatly modifies the function of the respiratory and circulatory systems. The physician scorned to stoop to such manual labor; the surgeon could not allow so minor a matter to distract him from his rapidly expanding art. There is evidence² that, in one ancient institution, surgeons operated without anesthetics for some years after their discovery because of a divergence of opinion with the house committee as to whether it was the function of the apothecary or that of the house surgeon to administer the anesthetic. It remained for an obstetrician and a general practitioner to devote themselves exclusively to this new phase of medicine. Not until the beginning of this century did medical men become interested in studying the behavior of the systems of the human

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1. Lister, Joseph: *On the Antiseptic Principle in the Practice of Surgery*, *Lancet* 2: 353-356 (Sept.) 1867.

2. Morris, E. W.: *A History of the London Hospital*, ed. 1, London, 1910, pp. 172-174.

16. Bunker, C. W. O., and Smith, E. E.: Tularemia: Report of Four Cases, One Fatal, with Autopsy Report, *U. S. Nav. M. Bull.* 26: 901 (Oct.) 1928.

17. McCoy, G. W.: A Plague-like Disease of Rodents, *Public Health Bulletin* 43, United States Treasury Department, Public Health Service, 1911.

18. Shattuck, G. C.: Plague, in Cecil, R. L.: *Text Book of Medicine*, Philadelphia, W. B. Saunders Company, 1940.

19. Reinmann, H. A.: *The Pneumonias*, Philadelphia, W. B. Saunders Company, 1938. Blackford and Casey.²

20. Wu, Lien-Teh: *Treatise on Pneumonia Plague*, Geneva, League of Nations, Health Organization, 1926.

body when in a state of artificial unconsciousness. In the intervening years the anesthetist drifted into a position in which he was merely a technician. He was, as it were, the "chauffeur" of the surgeon's car. It was his duty to drive recklessly, fast or slowly as his "owner" demanded. If a tire burst or if a bearing burned out because the "owner" had declined to allow the crank case to be refilled with oil, that was the responsibility of the "owner" and not of the "chauffeur." When and if some serious catastrophe occurred the "owner," instead of consulting the "chauffeur," called in the "service manager of the manufacturing firm" in the person of an internist. Such a consultant may possess more academic knowledge than the chauffeur but seldom has as much practical experience of the immediate problem. Moreover, such treatment soon stifles all initiative or enthusiasm in the chauffeur. Economically the anesthetist is as dependent on the "good will" of his surgeon as is the chauffeur on that of the owner.

In the United States this dependence resulted in the employment of the laity as anesthetic technicians. The function of these technicians was to be the employees of the surgeon and to do as he bade them; and it was assumed that his omniscience was such that he could perform an intricate and exacting operation and simultaneously exercise an adequate supervision both of the patient's condition and of the technic of administration of the anesthetic. In England, where the state of the law prohibits unqualified assistance and anesthesia comes within the legal definition of "the practice of medicine and surgery," the lay technician could not exist. Yet it soon became evident that there is but little difference in practice between a layman highly skilled in a manual art and an indolent person whose former medical training has been allowed to undergo a process of atrophy of disuse.

These facts probably account for the startling contrast between the development of surgery and that of anesthesia. In the former case the devotion of keen minds to the subject secured its rapid and progressive development. In the latter the subject remained almost at a standstill for the first sixty years after its inception. Of recent years, however, there has been a renaissance of interest in and original work on the subject of anesthesia which has brought forth greater advances in the last thirty years than had occurred in the previous seventy. These advances have been sufficiently spectacular to cause Lahey³ to write:

The field of anesthesia within the last few years exclusive of thoracic surgery has perhaps shown greater progress and development than that of surgery itself.

Moreover, they have fundamentally altered the relationship between anesthetist and surgeon. Whether this alteration has been for good or ill has depended in the main on the attitude of the surgeon. The true servant is he who allows no consideration to take precedence over the best interests of his patient and his art. At some time or another we have all been guilty of allowing our personal pride to supplant the patient's interest. Some older surgeons have fallen into this error when the services of a trained professional anesthetist first became available to them. They have done so partly because they could not conceive of an anesthetist as having any but a purely technical contribution to make, and partly because they were accustomed to exercise

absolute control of everything in the operating room and were unable to overcome the habit. In some cases the anesthetist himself has invited such treatment by gratuitous interference in purely surgical matters or by his ignorance of them. Where the advances of anesthesia have been put to good use it has usually been because of the encouragement of a surgeon of vision who could perceive the advantages which would accrue to his patients and his art. It has been my good fortune to be associated with several such, and I would be ungrateful indeed did I not acknowledge my debt to them.

ATTRIBUTES OF A SKILLED ANESTHETIST

How then can an anesthetist best serve the interests of the patient, of the surgeon and of his subject? In the first place he must know his own specialty thoroughly both in its practical and its academic aspects. If he is merely a good technician the scope of his services will be severely restricted. If he is deeply learned yet cannot give excellent anesthetics by any known method and with any agent he brings both himself and his subject into contempt. Furthermore he must have a sound grasp of the fundamentals of surgery, medicine and obstetrics. This should include sufficient direct experience of operative work to enable him to understand the difficulties with which a surgeon has to contend. He must be able to put himself in the surgeon's place and see the situation through his eyes in any ordinary case. When he cannot do so he should seek enlightenment from the surgeon and be prepared to accept it. He must cultivate a sound opinion as to the condition of the patient at any time during the operation and should also develop a prognostic ability. These qualities can be attained only by long experience and close and accurate observation carefully recorded. The acid test of all clinical work is the after-condition of the patient. Until we are in a position to compare the results of large numbers of cases from which as many variables as possible have been excluded we cannot fairly determine the value of any agent or method. Any worker who has had occasion to make a factual statement from memory and later to compare it with the recorded facts knows how fallible is his power of recollection. Therefore anesthetists must be prepared to keep such records, to compare series of cases from time to time and to meditate upon and draw conclusions from them. This exercise in observation will enable them to return a more convincing answer to the usual question in the operating room "Is he all right?" Moreover, the trained anesthetist can by these means recognize the onset of circulatory or respiratory embarrassment and can institute the appropriate supportive treatment. Such records can be of as great interest to the surgeon as to the anesthetist; for changes observed in relation to certain phases of the operation may throw light on points in diagnosis or of operative technic.

The skilled anesthetist will keep himself informed as to the condition of the patient after operation. There are two good reasons for doing so: The first is that a careful record of postoperative complications is essential to the evaluation of technic and of opinion. The second is that the anesthetist's specialized knowledge can be of use in the diagnosis and treatment of certain postoperative complications. Being expert in the use of artificial airways and oxygen therapy, he can often prevent grave respiratory sequelae by recognizing their

3. Lahey, F. H.: Progress of Anesthesia, editorial, *Am. J. Surg.* 34: 405-406 (Dec.) 1936.

onset and instituting timely prophylactic treatment. His familiarity with the technic of intubating the respiratory passages enables him to treat atelectasis by suction drainage. Pneumonia can thereby be avoided in a certain number of cases. By the use of a similar technic he can relieve the respiratory obstruction often seen in patients who lack the strength to cough up their own secretions. He can also relieve acute respiratory obstruction temporarily and advise as to the further treatment which may be necessary. He has a great experience in the administration of depressant drugs and therefore his opinion should be sought whenever questions of the expediency or the quantity of such administrations arise.

By the time he has been in practice for some years under these conditions his prognostic opinion as to the immediate hazards of a proposed operation in a given patient should be of value. In the past this attribute of an anesthetist has been neglected. When for years he has carefully observed and recorded the effects of a particular intervention he should surely be in better condition to form such an opinion than, for instance, an internist, who at most occasionally visits an operating room as a spectator. Since as a rule any anesthetist gives more anesthetics than does a surgeon perform operations, it is likely that the anesthetist's view as to the result might be a useful complement to that of a surgeon of equal seniority.

So much for his functions as they touch the operative aspect of surgery. By a process of consultation, however, the anesthetist can render other valuable services. Of all the staff he is, or should be, the most familiar with the mechanics both of normal and of pathologic respiration. Moreover he is experienced in securing a free airway, in the administration of gases and in the maintenance of respiratory exchange by artificial means. He should therefore be consulted with regard to any case of respiratory failure, depression or obstruction. In this capacity he can profitably supervise all administrations of gaseous therapy and the use of mechanical respirators. Because of his training in regional analgesia he is adept in blocking the various nerves. This faculty can be put to good use in consultation for purposes both of diagnosis and of treatment. The greater the anesthetist's grasp of clinical medicine, anatomy and physiology, the more profitable will be his services in this respect. Where spinal analgesia or intravenous anesthesia is desired in the diagnosis of vascular disease he is, logically, the person to consult. Some persons have suggested that, in addition to these duties, the anesthetist should have full charge of the arrangements for the storage and transfusion of blood. He must naturally be familiar with the process, particularly as regards the technic of transfusion. Yet many problems of serology and bacteriology arise which are outside the normal purview of the anesthetist; and if he carries out the functions already outlined he will be unable to find the time for such onerous further duties.

Lastly, the anesthetist and the radiologist share one great asset: by the very nature of their functions they are true consultants. That is to say, they treat a patient only at the request of a colleague. Rarely does a patient consult either except at the suggestion of another medical man. The position of a consultant should be that, in return for the assumption that he possesses a definite mastery of his own field, he concedes any pretense of serious knowledge of any other branch of medicine. He must, naturally, know some-

thing of everything, but he does so as a matter of general information and intelligence. He acknowledges that his opinion in any other branch of medicine is not worth mentioning to a worker in that field. This is of particular importance in his dealings with his surgical colleagues. For if he ventures to interfere with what are purely surgical decisions he need not be surprised if the surgeons institute reprisals in the form of interference in matters which should concern only the anesthetist. A surgeon has no more right to tell an anesthetist how to obtain the conditions required for operation than has the anesthetist to tell the surgeon how a patient should be operated on. This does not mean that enlightened discussion is not of the utmost value: it is dictation and not discussion which is wrong and harmful. The anesthetist must, like all consultants, remember that he is asked to furnish a specialist's opinion on a patient under the care of a colleague. He is not "in charge of the case."

COOPERATION BY THE SURGEON

Could all surgeons but have spent a few months as members of a department of anesthesia, any remarks as to how to cooperate with an anesthetist would be superfluous. After such an experience they would know that, although the course of anesthesia is often uneventful, grave difficulties are sometimes encountered. The dramatic suddenness with which uneventful induction or maintenance can give place to desperate attempts to resuscitate a patient in extremis cannot but leave its impress on the memory. This may happen at any time without previous warning. Even the minor perplexities which they would encounter in a month should satisfy them that the patient's interests demand the enlightened vigilance of an anesthetist of full medical education and specialized postgraduate training in his subject.

There are two ways in which surgeons usually fail their anesthetist. The first of these is by a lack of comprehension of his technical problems and difficulties. By way of illustration let us take the question of impatience with the time consumed in the induction of anesthesia. This may legitimately vary from three to thirty minutes before the patient is ready for the incision. Many factors account for this great variation: the agent and method used, the individual resistance of the patient, the depth of anesthesia required for the performance of the operation, the patency of the patient's airway and the efficiency of his alveolar surface, the advisability or otherwise of tracheal intubation, and the competence of the anesthetist. Too many surgeons are prone to overlook these matters and to assume that all delay must be due to the last-mentioned factor. They rarely realize that the process of saturation of the tissues with the agent is a slow one and that the rapid production of deep anesthesia can be dangerous in itself. Their impatience, if they are in the same room, usually communicates itself to the anesthetist, who then as a rule wastes fifteen minutes in an attempt to save five. What is worse, he usually "loses his head," and it is then that accidents are liable to occur. An anesthetist was once performing a difficult and tedious induction in a patient with chronic respiratory obstruction. Through the open door of the operating room he heard the surgeon say to a guest "I don't care how long I wait for this patient, for I know that every five minutes Dr. — wastes outside will save me ten in operating." Those two men understood each other and have together been able

to do things which, without that perfect mutual understanding and confidence, would almost certainly have involved the death of the patient. Too few surgeons realize the close connection between reflex glottic spasm and intense surgical stimulus. The most fertile source of disagreement centers round the question of how much relaxation should be provided, having due regard for the patient's condition. This issue has been discussed in a recent essay⁴ and will not be reopened here.

Too much importance has been attached to the anesthetic agent and too little to the hands which use it and their degree of skill. Chloroform in some hands is safer than ether in others, and for this reason most of the figures hitherto quoted as arguments of "safety" are misleading. Each case is a problem in itself and therefore no one agent or method will in the long run prove as safe and satisfactory as a judicious selection for a given patient. Surgeons, of all men, should have reason to know that a balanced judgment is more important than a method or a drug.

This brings us to the second and last point: that the all important factor is the attitude of the surgeon toward his anesthetist. It has been admirably summed up by a distinguished plastic surgeon:⁵

The surgeon who attempts cleft lip and palate surgery without the help of a well organized team is courting disappointment. He may justifiably rank himself captain of this team but he should not consider himself as seriously more important than any one of its members. Intimate collaboration between surgeon and anesthetist is of prime importance. The anesthetist makes the surgeon's work possible; the surgeon should see to it that he does nothing which will render the anesthetist's work more difficult.

The essentials of their relationship are mutual professional confidence, understanding, frankness, honesty and courtesy, with fairmindedness on both sides. The anesthetist stands ready and willing to help the surgeon: to do so he must be treated as an adult and not as a foolish child. A technician cannot be treated as a colleague in the fullest sense, but these essentials can always be fulfilled between colleagues. The highest and best fruits of this relationship are seen when intimate personal friendship is superadded to these desiderata. It is at this mark that we must aim.

4. Gillespie, N. A.: *Relaxation: A Meditative Essay*, Anesthesiology 1: 292-299 (Nov.) 1940.

5. Kilner, T. P.: *Cleft Lip and Palate Repair Technic*, St. Thomas's Hosp. Rep. 2: 127-140, 1937.

The Body Anatomic and the Body Politic.—Despite its shortcomings, its incompleteness, its groping, medicine stands today as one of the great triumphs of the human spirit. To contemplate medicine in time of war is to be reminded of the vast discrepancy that exists between our knowledge and control of the human body anatomic and our knowledge and control of the human body politic. Men associated in nations have united in vast cooperative projects of destruction, they have engaged their mechanical and engineering skills, their physical, chemical and biological knowledge, in titanic efforts to render human life unendurable if not impossible. Men associated in research teams, in laboratory staffs, in international academies and societies of medical and other life sciences have sought just the opposite ends. They have endeavored to apply all the technics of physics, chemistry and biology to the alleviation of disease, the preservation of life and the postponement of death. It is fair to say that never in the history of civilization has man been so insecure against the machinations of his fellow human beings and so safe against the threats of disease.—Gray, George W.: *The Advancing Front of Medicine*, New York, McGraw-Hill Book Company, Inc., 1941.

PREMARITAL EXAMINATION LAWS IN THE UNITED STATES

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With the passage of six new premarital examination laws by 1941 legislatures, thirty states now require that a certificate of examination be presented before marriage licenses may be issued. All of these measures have one objective in common; namely, prevention of the spread of syphilitic infections through the vehicle of marriage. A number of them are aimed also at curbing other venereal diseases, and a few undertake to reduce the incidence of tuberculosis or mental disorders as well. Most of them, however, resemble Connecticut's successful law, adopted by that state in 1935, to the extent of requiring a blood test for syphilis.

The diversity of legal and administrative details which characterizes the premarital laws of the various states is not surprising when one considers their separate origin in as many legislatures. In some instances original bills had to be modified to satisfy local opposition. Several states had early but ineffective laws on their books which necessitated amendment or repeal. Variations in the required procedures of the several laws would be a matter of less concern if every one chose a mate within the boundaries of his own state. Interstate marriages, however, are common in normal times and are now considerably increased as a result of the translocation of many eligible young men in the army camps. While all the premarital laws are relatively simple in their modus operandi for residents of their own states, some of them contain stipulations which interpose serious obstacles in the way of out of state applicants. These are not lessened by the difficulty of securing authentic information about the procedure required in another state. The layman often does not understand that he can best secure this information from the health department of the state in which he expects to marry. He is most likely to inquire of a local physician or the local health department. The data presented in tables 1 to 4 inclusive have been distributed to local health administrators in Illinois to assist them in replying to such queries.¹ They are here offered to a larger audience in the hope that they may fill a need in other states.

It seems to us a good time, moreover, to examine critically the existing premarital measures and to inquire what provisions promote and which ones hamper venereal disease control. The lack of reciprocity in some states relative to premarital laboratory tests performed in other states is one point which has aroused considerable discussion and some remedial action on the part of state health officials. This is only one aspect, however, of the problem of nonreciprocity. The restrictive license and residence requirements which apply to the examining physician in certain states impose almost as great difficulty in the way of interstate marriages. Numerous lesser complications arise from the mere diversity of procedural details under different laws.

From the Division of Laboratories, Illinois Department of Public Health.

1. Revision of tables presented at Conference of State and Provincial Laboratory Directors in October 1940 (Detroit) and October 1941 (Atlantic City, N. J.).

The questions discussed here are those which have arisen most frequently in our own experience. Briefly they are: 1. What is the scope of the examination? 2. What laboratory tests are required? 3. What laboratories are approved for making the required tests? 4. Who is empowered to examine? 5. Under what circumstances, if any, may infected persons, or those whose laboratory tests are reported as positive, secure licenses to marry?

1. WHAT IS THE SCOPE OF THE EXAMINATION?

A fully authoritative discussion of premarital examination laws and their operation could be made only on

Oregon and Wisconsin, however, in 1913 approved bills which have remained in force until recently amended or replaced by improved measures. Several other states followed their example during the next few years: Alabama in 1919, North Carolina and Wyoming in 1921, Louisiana in 1924 and Texas in 1929. Considerable credit should be given to the promoters of these early laws in spite of the fact that they were relatively ineffective. They rendered at least one important contribution in pointing out mistakes to be avoided. Their most serious shortcomings were due to failure to make laboratory tests mandatory and to declare a penalty for nonobservance. Each of them,

TABLE 1.—Scope of Examination

State	Conditions to Be Examined For	Laboratory Tests Required
Alabama.....	All venereal diseases ¹	None ²
California.....	Syphilis.....	Serologic test for syphilis
Colorado.....	All venereal diseases.....	Serologic test for syphilis
Connecticut.....	Syphilis.....	Serologic test for syphilis
Illinois.....	All venereal diseases.....	Serologic test for syphilis; microscopic smear for gonorrhea
Indiana.....	Syphilis.....	Serologic test for syphilis
Iowa.....	Syphilis ³	Serologic test for syphilis ³
Kentucky.....	Syphilis.....	Serologic test for syphilis (dark field "when moist lesions are present")
Louisiana.....	All venereal diseases ¹	None ²
Maine.....	Syphilis.....	Serologic test for syphilis
Massachusetts.....	All infectious diseases dangerous to the public health ⁴	Serologic test for syphilis
Michigan.....	Syphilis, gonorrhea, chancreoid.....	Serologic test for syphilis (dark field and gonorrheal smear at discretion of examining physician)
New Hampshire.....	Syphilis.....	Serologic test for syphilis
New Jersey.....	Syphilis.....	Serologic test for syphilis
New York.....	Syphilis.....	Serologic test for syphilis
North Carolina.....	All venereal diseases, tuberculosis, epilepsy, idiocy, imbecility, or other mental imbalance.....	Serologic test for syphilis
North Dakota.....	Syphilis.....	Serologic test for syphilis
Ohio.....	Syphilis ⁵	Serologic test for syphilis ⁵
Oregon.....	All venereal diseases, epilepsy, feeble-mindedness, insanity, drug addiction, alcoholism.....	Serologic test for syphilis; (gonorrheal smear when prescribed by examining physician)
Pennsylvania.....	Syphilis.....	Serologic test for syphilis
Rhode Island.....	Syphilis, gonorrhea, tuberculosis.....	Serologic test for syphilis
South Dakota.....	Syphilis.....	"Microscopic and serologic tests for syphilis"
Tennessee.....	Syphilis (gonorrhea and chancreoid if history of infection).....	Serologic test for syphilis; dark field if prescribed by examining physician (tests for gonorrhea or chancreoid if history of infection)
Texas.....	All venereal diseases ¹	None
Utah.....	Syphilis.....	Serologic test for syphilis
Vermont.....	Syphilis.....	Serologic test for syphilis
Virginia.....	Syphilis.....	Serologic test for syphilis
West Virginia.....	Syphilis.....	Serologic test for syphilis
Wisconsin.....	All venereal diseases ¹	Serologic test for syphilis ⁶
Wyoming.....	Syphilis, gonorrhea, chancreoid ¹	Serologic test for syphilis ¹ ; microscopic smear for gonorrhea ¹

1. Applies to male applicants only.
 2. Unless prescribed by examining physician.
 3. Applicant from another state in which premarital examination and laboratory tests are required must fulfil his own state law in lieu of Iowa's and must submit certificate used in his own state signed by the examining physician and notarized. Iowa nonresident examination form is required for residents of states which have no premarital examination laws.
 4. A list of forty-two such diseases is published by the Massachusetts Department of Public Health. Physicians must inform both parties of hazards involved in their marriage if any of these diseases is present, but marriage license may not be refused because of its occurrence.
 5. Applicant from another state in which examination and laboratory tests are required before marriage must fulfil requirements of his own state and submit a certificate from an official in his own state who is empowered to issue marriage licenses, stating that he is eligible for marriage in that state. Residents of state having no such legislation must proceed to Ohio and conform with same requirements as citizens of latter state.
 6. Examination required of male applicants only; blood test of both sexes. Physician may require male to have laboratory tests for other venereal infections.

the basis of a first hand study of each in the state which adopted it. This applies particularly to the scope of the examinations required by the several measures. The administration and, to a large extent, the interpretation of technical points in each instance have been properly entrusted to the health department of the state concerned. When questions requiring interpretation have arisen in the course of the compilation, they have been submitted to the respective state health departments for their opinions. It is, nevertheless, still possible that misinterpretations have occurred in our exposition. If any are discovered by our readers, we will appreciate being informed of them.

Premarital examination laws are of less recent origin than is commonly realized. The state of Washington adopted the pioneer measure in 1909, which was repealed the next year. The legislatures of North Dakota,

moreover, was made applicable only to the male candidate for a marriage license.

The first really effective prenuptial examination statute was that passed by the Connecticut legislature in 1935. Requiring that both applicants for marriage license submit to blood tests for syphilis, this law was made enforceable by providing for the fining and imprisonment of any local registrar who should issue a license without first receiving from both applicants certificates of examination by licensed physicians and reports of laboratory tests, declaring their freedom from syphilis. It is to be noted that while the text of this law does not stipulate an examination by the physician, the certificate to be signed by the latter declares that the applicant has been examined and, in the opinion of the examiner, is free from syphilis in a form in which it may become communicable.

The immediate success of the Connecticut law prompted other states to enact similar measures. Among those which had passed the earlier ineffective type of laws, North Carolina, North Dakota, Oregon and Wisconsin have either amended them or replaced them with statutes specifying laboratory tests of both sexes and establishing penalties for nonobservance. Alabama and Louisiana retain without alteration their original laws, applicable only to males, requiring laboratory tests only when deemed necessary by the examining physician and declaring no penalty for failure to conform. Texas also has made no modification of its first measure, which contains provisions similar to those of Alabama and Louisiana, except that under no circumstances may laboratory tests be required. Wyoming's original law, which likewise applies only to males, has been revised not through legislative amendment but by a state board of health ruling which requires physicians to "secure evidence of freedom from a communicable form of syphilis by a recognized serological laboratory blood test and . . . of gonorrhea by a negative microscopic test for gonococci."

As shown in table 1, seventeen of the thirty states which have adopted premarital legislation require examination only for syphilis. Most of the remainder specify either that (1) syphilis, gonorrhea and chancroid or (2) all of the venereal diseases must be looked for. New Hampshire's enactment, like that of Connecticut, does not specify any sort of physical examination, but the certificate signed by the physician declares that an examination for syphilitic infection has been made and that a laboratory blood test has been performed. A separate section of the marriage laws of New Hampshire forbids persons to marry who have been reported to the state board of health as suffering from gonorrhea or syphilis and also forbids town clerks, when so informed, to issue a marriage certificate to such persons without consent of the board of health. Wisconsin's law has certain peculiarities that are due to the manner in which the original law was amended. Prior to the amendments of 1937 and 1939 this law required the examination of all male applicants for the presence of any of the venereal diseases. The recent amendments make blood tests for syphilis a requirement for both applicants for a license but fail to specify a physical examination for the female. The certificate, therefore, contains two statements requiring separate signatures when a male applicant is examined, the first pertaining to the physical examination, the second to the serologic test for syphilis. For the female applicant, of course, only the second statement applies.

While most of the enthusiasm for premarital examination laws has arisen coincidentally with the recent popular interest in venereal disease control, a few states have incorporated these measures into a more broadly eugenic program. North Carolina and Rhode Island include tuberculosis among the diseases to be examined for, and a license is refused if either applicant is found to be in an infectious stage of the disease. North Carolina and Oregon also require that epilepsy and the several forms of mental defectiveness be looked for, and Oregon adds drug addiction and chronic alcoholism to the list of maladies for which applicants may be refused a license to marry. New Hampshire law forbids the marriage of any epileptic or mental defective, except it be a woman of 45 or over, and further forbids any clergyman or officer to issue a marriage certificate in such a case.

The most recently adopted premarital law, which became effective in Massachusetts on Nov. 1, 1941, is broader than all of its predecessors in the scope of the examination which it requires. Furthermore, it does not forbid the marriage of persons who are infected with syphilis or other communicable diseases even though one or both parties are in a stage in which such disease may be transmitted. The provision just mentioned is somewhat similar to a section of the Virginia law (discussed in section 5), which, however, requires that the infected applicants agree to submit to a prescribed course of treatment. Examining physicians are expected to look for "evidence of any infectious disease declared by the state department of public health to be dangerous to the public health" and, if any is found, to inform both parties of the hazards involved in their intended marriage. A list is issued by the Massachusetts Department of Public Health of forty-two diseases which are declared to be dangerous to the public health.

2. WHAT LABORATORY TESTS ARE REQUIRED?

It has been noted in the preceding section that the first really effective premarital examination measures made a laboratory test for syphilis a requirement for both sexes and provided for enforcement by fixing responsibility on the license-issuing official for seeing that the requirement is observed and establishing penalties for nonconformance.

Twenty-six states, as table 1 shows, have made the premarital blood test a legal requirement for both sexes and have declared penalties for failure to conform. Wyoming's pioneer law, as suggested in the preceding section, has no such clause, but the board of health of that state adopted a regulation in 1931 redefining "What constitutes a proper examination for a marriage certificate?" which stipulates that all male candidates for marriage licenses shall submit to laboratory tests for syphilis and gonorrhea. However, in the absence of penalties for nonobservance this ruling has been difficult to enforce. It has also been stated that in Texas no premarital laboratory tests are required, while in Alabama and Louisiana they are demanded only when deemed necessary by the examining physician.

Dark field examinations are not mentioned in most of the laws now in effect but are specifically required under the Kentucky law "when moist lesions are present" and in Michigan and Tennessee "where indicated." In the South Dakota statute it is suggested by the phrase "standard microscopic and serological tests for syphilis." While implied in the pioneer laws of Alabama and Louisiana, there is no apparent means of enforcement in either of these states.

Only two states have made an absolute requirement of any laboratory tests other than a serologic test for syphilis. In Illinois "microscopical examinations of smears from the genitalia for the gonococcus of gonorrhea" are specified in the text of the law. Oregon's measure is so worded as to require microscopic examination of "smears from the mucous membranes of the sex organs" only "when considered necessary" by the examining physicians. In the actual administration of the law, however, this examination has been made compulsory.

There has been no tendency in any of the laws thus far framed to grant official recognition to the serologic

test of one author exclusively. Although a few statutes make generic reference to particular technics, in none of them is approval restricted to a single test. In most instances the state health commissioner or state department of health has been delegated authority to declare what tests are to be considered standard. It is not surprising that under such circumstances a high degree of reciprocity is in effect between states as far as the acceptability of particular tests is concerned. The position taken by the Illinois Department of Public Health, "approving laboratories rather than tests," seems to represent a common attitude. Several state health

standpoint of reciprocity, contributing largely to an appreciation of the dependability of the tests named.

3 WHAT LABORATORIES ARE APPROVED?

In most states the responsibility of approving laboratories for performance of prenuptial tests has been vested in the state board of health, the state department of health or the state health commissioner. Indiana's premarital statute differs somewhat, however, making the stipulation that such tests may be made in "laboratories meeting standards prescribed by the pathology department of Indiana University School of Medicine

TABLE 2—*Approved Out of State Laboratories and Approved Tests*

State	Laboratories Approved Outside of State	Approved Blood Tests
Alabama	None	"Recognized laboratory tests"
California	State, territorial, provincial (Canadian) laboratories and U. S. P. H. S., Army and Navy laboratories	Kolmer, Eagle or Craig fixation, Kahn, Kline, Hinton, Eagle precipitation
Colorado	State and local laboratories approved by own state health department	None specified
Connecticut	None ¹	Wassermann, Kahn, Kline, Hinton
Illinois	State laboratories, U. S. Army, Navy, Marine, and P. H. S. laboratories, District of Columbia and New York City laboratories	"Any test routinely employed by an approved laboratory"
Indiana	State Health Department laboratories	Kolmer and Eagle fixation, Kahn, Kline, Hinton, Eagle precipitation, Mazzini
Iowa	Same as approved by Illinois (above)	"Standard microscopic and serologic tests for syphilis"
Kentucky	None	Kolmer, Kahn, Kline, Hinton, Eagle precipitation
Louisiana		"Recognized laboratory tests"
Maine	State Health Department laboratories	Kahn, Hinton
Massachusetts	Same as approved by Illinois	Standard serologic test for syphilis
Michigan	List issued by Michigan Department of Health	None specified
New Hampshire	Official state health and U. S. P. H. S. laboratories and local laboratories approved by own state health department	Wassermann or Kahn
New Jersey	By arrangement with New Jersey Health Department	Wassermann, Kahn or other standard test
New York state	None	None specified
New York city	Same as approved by Illinois (above)	None specified
North Carolina	State laboratories and local laboratories approved by own state health department	Kolmer and Eagle fixation, Kahn, Kline, Hinton, Eagle precipitation
North Dakota	None	Not specified
Ohio	State and local laboratories approved by own state health department in states which require blood test, none approved in other states	Not specified
Oregon	State and local laboratories approved by own state health department	Kolmer and Kahn
Pennsylvania	State Health Department laboratories	Wassermann, Kahn, Kline, Hinton, Eagle precipitation, Boerner Luken ²
Rhode Island	All state laboratories, local laboratories only by arrangement with Rhode Island Health Department ²	Wassermann, Kahn or other standard laboratory test
South Dakota	State and local laboratories approved by own state health department	"Standard serologic test for syphilis"
Tennessee	State and territorial laboratories, U. S. P. H. S., Army and Navy laboratories, District of Columbia laboratories; laboratories of author serologists (Eagle, Hinton, Kahn, Kline, Kolmer)	Eagle, Hinton, Kahn, Kline, Kolmer
Texas	None	None
Utah	State health department laboratories	Any standard test
Vermont	State laboratories, District of Columbia and New York City laboratories	Not specified
Virginia	State laboratories; U. S. P. H. S. laboratories	"A standard serologic test"
West Virginia	State health department laboratories	"Any standard serologic test for . . . syphilis"
Wisconsin	State or local laboratories approved by own state health department (affidavit of approval required signed by officer of state health department)	"Standard blood test for syphilis"
Wyoming	None	None specified

¹ Connecticut has approved the laboratories of the Illinois Department of Public Health and presumably other out of state laboratories for the performance of blood tests for men in the armed services.

² Special routine for reporting by out of state laboratories. Information obtainable from Chief, Division of Laboratories, Rhode Island Department of Health.

departments have given approval to those tests which received recognition in the evaluation studies² of the U. S. Public Health Service, namely the Kolmer and Eagle modifications of the Wassermann test, the Kahn standard, Kline diagnostic, Eagle and Hinton precipitation tests. These studies were timely indeed from the

and approved by the Indiana state board of health." In North Dakota no system for approving laboratories is provided by the measure, which specifies that "a standard serological test . . . for syphilis approved by the state health officer . . . shall be performed by the state department of health." The early laws adopted in Alabama, Louisiana, Texas and Wyoming likewise require no program of laboratory approval, since they make no rigid stipulations regarding laboratory tests.

Approval of intrastate laboratories in some states is based on inspection of facilities and the sending out of frequent check specimens. This is probably as effective and economical a method as any yet tried. For out of state laboratories, however, no such basis of approval

² Cumming, H. S., Hazen, H. H., Sanford, A. H., Seneff, F. E., Simpson, W. M., and Vonderlehr, R. A., Ven. Dis. Inform., reprint 52, June 1935; Parran, Thomas, Hazen, H. H., Sanford, A. H., Seneff, F. E., Simpson, W. M., and Vonderlehr, R. A., *ibid.*, reprint 61, January 1937; Hazen, H. H., Parran, Thomas, Sanford, A. H., Seneff, F. E., Simpson, W. M., and Vonderlehr, R. A., *ibid.*, reprint 66 May, 1937; Parran, Thomas, Hazen, H. H., Mahoney, J. F., Sanford, A. H., Seneff, F. E., Simpson, W. M., and Vonderlehr, R. A., *ibid.*, reprint 72, August 1937; Hazen, H. H., Parran, Thomas, Mahoney, J. F., Sanford, A. H., Seneff, F. E., Simpson, W. M., and Vonderlehr, R. A., *ibid.* 21:171 (June) 1940.

³ Footnote deleted on proof.

is afforded. This fact, probably more than any other, has impeded the establishment of reciprocal recognition of premarital tests performed by laboratories in different states. A few states (Kentucky, New York outside New York City and North Dakota) will accept no reports of premarital tests performed in laboratories outside their respective state boundaries, as shown in table 2. It is of interest to note, however, that in no state except North Dakota is there any legal obstacle to the approval of out of state laboratories for the performance of these tests. It has been pointed out that the North Dakota act requires that they be made by the North Dakota State Department of Health. It seems

tion 4 and table 3) and must then wait five days for issuance of the license (see table 4).

The New Jersey and Michigan departments of health have approved selected laboratories in other states invite negotiation looking toward the approval of others. Michigan's health department has issued an extensive list of approved laboratories, which includes most of the state laboratories and a good many local ones.

In more than half of the states which have premarital measures, tests performed in the laboratories of other state health departments are regarded as acceptable (California, Colorado, Illinois, Indiana, Iowa, M

TABLE 3.—License and Residence Restrictions; Sources of Examination Forms

State	Who May Examine? (License and/or Residence Requirements)	Certificate Forms Obtainable from (a) State Health Department; (b) County Clerks; (c) Approved Laboratories; (d) Other Sources
Alabama.....	Alabama license required ¹	(a)
California.....	Any licensed physician.....	(a); (c); (d) officials authorized to issue marriage licenses
Colorado.....	Any licensed physician.....	(a); (b); (c)
Connecticut.....	Connecticut license required ²	(a); (c)
Illinois.....	Illinois license required ^{3, 4}	(b)
Indiana.....	Any licensed physician.....	(a); (d) clerks of circuit courts
Iowa.....	Any licensed physician.....	(a); (d) clerks of district courts ^{5, 8}
Kentucky.....	Kentucky license required ^{6, 7}	(a); (d) county and city health department
Louisiana.....	Any licensed physician.....	(d) authorized licensing officers
Maine.....	Maine license required ¹¹	(a); (d) state health laboratories
Massachusetts.....	Massachusetts license and active practice in that state or active medical commission in armed forces of United States	(a)
Michigan.....	Any licensed physician.....	(a)
New Hampshire.....	New Hampshire license required ²	(a)
New Jersey.....	Any licensed physician.....	(a); (c); (d) authorized license issuing officers
New York.....	Any physician licensed to practice in state in which he resides or maintains an office ⁷	(a); (d) New York City Health Department
North Carolina.....	North Carolina license and residence required ^{3, 4}	(a); (d) registers of deeds ⁸
North Dakota.....	Any licensed physician ⁹	(a); (d) state health laboratory
Ohio.....	Any licensed physician ¹⁰	(a) ¹⁰
Oregon.....	Oregon license and residence required ^{3, 4}	(a); (b)
Pennsylvania.....	Pennsylvania license required ^{3, 4}	(a); (d) clerks of orphans' courts
Rhode Island.....	Rhode Island license required ^{3, 4}	(a); (d) town and city clerks
South Dakota.....	Any physician licensed to practice in state in which he resides.....	(a)
Tennessee.....	Any physician licensed to practice in state in which he resides.....	(a); (b); (d) city and county health department
Texas.....	Texas license; residence in county where license applied for.....	Form not specified
Utah.....	Any licensed physician.....	(a)
Vermont.....	Vermont license required ²	(a)
Virginia.....	Any physician licensed in any state, territory, county, or District of Columbia	(a)
West Virginia.....	West Virginia license required ²	(a); (d) state health laboratory
Wisconsin.....	License to practice in Wisconsin or in applicant's state required.....	(a)
Wyoming.....	Wyoming license and residence required.....	(a)

1. Administrative ruling, not stipulated in law.

2. Attorney general's ruling, not stipulated in law.

3. Stipulated in legislative enactment.

4. But physicians licensed in applicant's state may take specimen and have same examined in own state laboratory. (Oregon will accept report from any laboratory approved by its own state health department.)

5. See footnote 3 under table 1.

6. Law reads "physicians authorized to practice medicine in Kentucky."

7. Or commissioned medical officer of United States Army, Navy or Public Health Service.

8. Special laboratory report form for out of state examinees.

9. But law requires blood specimen to be examined by North Dakota State Health Department laboratory.

10. But see footnote 4 under table 1.

11. By 1942 amendment a licensee of another state may sign statement if a graduate of a class A medical school.—Ed.

a safe inference, however, that the health departments of the other nonreciprocating states have taken a similar position because of a conviction that approval should be limited to laboratories over which a degree of control can be exercised.

Until recently Connecticut's law also has been administered on a nonreciprocating basis. Owing to the present military situation and the consequent dispersion of Connecticut citizens enrolled in the armed forces, some out of state laboratories ⁴ have been approved for the performance of the required blood tests. It is doubtful, however, whether this modification will be of much assistance to men in the service who wish to marry in Connecticut, since they must still be examined by a physician licensed to practice in that state (see sec-

Massachusetts, North Carolina, Ohio, Oregon, Pennsylvania, Rhode Island, South Dakota, Tennessee, Utah, Vermont, Virginia, West Virginia and Wisconsin, as well as New York City, which is empowered to approve laboratories independently of the New York State Health Department). Reciprocity is hampered, however, in some of these states (Illinois, Maine, Massachusetts, North Carolina, Ohio, Oregon, Pennsylvania, Rhode Island, Vermont and West Virginia) because of other restrictive provisions, especially those which involve the licensure requirements of the examining physicians. These are more fully discussed in section 4.

The California, Illinois, Iowa, Massachusetts, Tennessee, Virginia and New York City health departments also approve certain federal laboratories, and several state health departments extend approval to certain out of state local laboratories. Thus Colorado, North Carolina, Oregon, South Dakota and Wisconsin will

4. Such approval has probably been restricted to the laboratories of state health departments, but we have been unable to obtain an answer on this point from the Connecticut State Health Department.

accept a report of a test made in any laboratory approved by its own state health department. Wisconsin requires, in this connection, an affidavit signed by an official of the state health department concerned, testifying to the competence of the laboratory performing the test or tests. Rhode Island will recognize reports of tests made by state and municipal laboratories and the laboratories of large hospitals as satisfying the requirements of its premarital statute. The procedure followed in this state requires that a report of a test by an out of state laboratory be mailed to the chief of the Division of Laboratories of the Rhode Island Department of Health, Providence, who will then fill out the laboratory form used in that state and return it to the applicant. This form comprises the lower half of the certificate to be signed by the Rhode Island licensed physician who makes the physical examination of the applicant (see the following section and table 3).

4. WHO IS EMPOWERED TO EXAMINE?

Generally speaking, the laws of the various states fall into two groups as regards the matter of licensure, namely (1) those which permit any licensed physician to perform examinations and (2) those which require that the examining physician be licensed to practice in the state in which the marriage license is sought. There is much variation, however, in the exact stipulations on this point. Under the premarital laws of California, Colorado, Indiana, Iowa, Michigan, New Jersey, North Dakota and Utah, all properly licensed physicians are empowered to examine, regardless of their places of residence or of practice. In the Tennessee enactment a qualified physician is defined as one "who is a graduate of a reputable medical school and licensed to practice medicine in the state in which he resides." Wisconsin's original law, which applied only to male applicants, specified that "examiners shall be duly licensed to practice in this state or in the state in which such male person resides." The amendment to this measure, which requires a serologic test for syphilis of both applicants, makes no specifications regarding licensure. An administrative regulation establishes a similar requirement for male applicants in Louisiana, where the text of the law contains no provision on this point. New York (both state and city) requires that the examiner be "licensed in the state in which he resides or in which he maintains his office." Commissioned medical officers of the United States Army, Navy or Public Health Service are also empowered by this state to examine candidates for marriage. Virginia will accept certificates of examination signed by medical licensees of any state, territory, county or the District of Columbia. Practically speaking, the prenuptial laws of Tennessee, Wisconsin, New York and Virginia operate in much the same manner as those of Colorado, Indiana, New Jersey and North Dakota as far as licensure regulations are concerned, and comparatively few physicians would fail to qualify under any of these acts.

Under the recently enacted Ohio law any licensed physician is authorized to make premarital examinations wherever his residence may be. Practically, only physicians residing in the twenty-five states which have laws resembling those of Ohio (see table 1, footnote 4) may perform this service since residents of other states must go to Ohio for their examinations.

Alabama's law is not explicit with regard to licensure. In the administration of the measure, however, license

to practice in Alabama is required.⁵ Essentially the same situation exists in Connecticut, where an attorney general's ruling has interpreted the term "licensed physician" to mean licensed by its own state boards. The same is true in New Hampshire. In Maine^{5a} and Vermont, where premarital laws were passed by 1941 legislatures, a similar restriction is incorporated in the texts of their respective measures. The premarital statutes of Oregon and Wyoming still further restrict the right to examine, stipulating both residence within their respective state boundaries and license to practice therein. The Kentucky statute is only slightly more liberal, empowering commissioned medical officers of

TABLE 4.—Time Limitations

State	Duration (in Days) of			Legal Waiting Period
	Validity of			
	Exami- nation	Laboratory Tests	License	
Alabama.....	15	*	*	*
California.....	30	30	No limit	3
Colorado.....	30	30	30	None
Connecticut.....	*	40	No limit	5
Illinois.....	15	15	30	1 ¹
Indiana.....	30	30	60	None
Iowa.....	20	*	20	None
Kentucky.....	15	15	30	None
Louisiana.....	15	*	*	None
Maine.....	6	30	One year	5 ¹
Massachusetts.....	30	30	60	5 ¹
Michigan.....	30	*	No limit	5
New Hampshire.....	*	30	Six months	5
New Jersey.....	*	30	30	3
New York.....	30	30	60	3 ²
North Carolina.....	7	14	60	None
North Dakota.....	30	30	60	None
Ohio.....	30	30	*	5 ³
Oregon.....	10	10	No limit	3
Pennsylvania.....	30	30	60	3
Rhode Island.....	*	40	90	None ⁴
South Dakota.....	20	20	20	None
Tennessee.....	*	30	*	*
Texas.....	*	*	*	*
Utah.....	*	15	30	None
Vermont.....	30	*	60	5
Virginia.....	30	30	*	None
West Virginia.....	30	30	*	3
Wisconsin.....	15	15	*	5
Wyoming.....	10	*	*	*

* Information not furnished (in some cases not obtainable).

1. Filing of intention to marry.

2. Marriage may not be solemnized until twenty-four hours after issuance of license nor until three days after specimen has been taken for blood test.

3. Special time requirements, pertaining to publication of banns, applicable to church weddings in Ohio.

4. Except for prospective bride from another state who must fill and sign license not less than five days previous to marriage and leave same in hands of clerk during this period.

the U. S. Army, Navy and Public Health Service to make examinations as well as physicians licensed and resident in Kentucky.

The new prenuptial law of Massachusetts, as first approved, resembled the laws of Maine and Vermont in the matter of licensure. It was amended before the effective date (Nov. 1, 1941) was reached, however, to permit physicians on active duty in the armed forces of the United States to make the required examinations. This modification simplifies matters for service men but fails to help civilians outside Massachusetts who wish to marry in that state.

Texas prescribes the most strict geographic limitations of all the states, specifying that the examining physician must be licensed to practice in Texas and reside in the

5. Personal communication to the authors from the administrative assistant of the state health officer.

5a. By 1942 amendment a licentiate of another state may sign statement if a graduate of a Class A medical school.—Ed.

county in which the marriage license is sought.⁶ While the North Carolina law is interpreted as requiring that the certificate of examination be signed by a physician practicing in that state, provision is made in the administration of the statute for accepting reports on blood specimens drawn by any properly licensed out of state physician and tested locally in any laboratory approved by its own state health department. A special form obtainable from the North Carolina Board of Health must be completed by any out of state laboratory which performs a premarital test. This must be submitted to the registrar of deeds along with the laboratory's report of the test and the certificate of medical examination by a North Carolina physician, when the applicant seeks to obtain a license. It should be noted, however, that the law of this state exempts from its provisions applicants for license who come from states not having a similar enactment. Oregon's law is apparently administered in much the same way, since any laboratory approved by its own state health board is permitted to make the required tests even though the physical examinations must be made by physicians licensed by the Oregon State Board of Medical Examiners and resident in that state. The Rhode Island statute is administered on very nearly the same basis except for the fact, which was noted in the preceding section, that approval of out of state local laboratories depends on recognition by the chief of the Division of Laboratories in the Rhode Island Department of Health. Pennsylvania's premarital examination act also operates in similar fashion, but in this case an out of state physician who draws a blood specimen must send it either to his own state laboratory or to an approved Pennsylvania laboratory. On receipt of the laboratory report he must forward it to a Pennsylvania physician whom the applicant has selected, perhaps with the assistance of friends, the American Medical Directory or the local medical society. This physician will then make the required physical examination and sign the prescribed certificate after the candidate has arrived to make application for license to marry. The premarital statute of West Virginia stipulates without any qualification that medical licensees of that state only are empowered to make the required examinations. The Illinois law carries a similar provision, but a ruling by the Director of Public Health authorizes any licensed physician in any state to secure the specimens required by law and have them examined in his own state laboratory or a federal laboratory. This is essentially the same state of affairs as described for North Carolina, Oregon, Rhode Island and Pennsylvania. An Illinois licensed physician must complete the examination and sign the certificate, but even this is not quite so restrictive as it sounds, since in this state neither annual fee nor renewal of a medical license is required. Hence many physicians practicing in other states retain Illinois licenses obtained earlier in their professional careers. It is possible, therefore, for such a physician to obtain examination certificate forms from an Illinois county clerk and complete the entire examination required by the Illinois prenuptial act, including the securing of the specimens, having them examined by the state health laboratory of the state in which he lives, making the physical examination of the applicant and signing the certificate.

Table 3 summarizes these points of difference.

5. RESTRICTIONS UNDER WHICH INFECTED PERSONS OR POSITIVE REACTORS MAY BE GRANTED LICENSES TO MARRY

Most of the existing premarital examination statutes contain provisions for abrogation of certain requirements under some circumstances. Hardly any two states have adopted exactly similar provisions, however, in this respect. Pregnancy of the female applicant, the prospect of legitimizing a child born out of wedlock, treatment for a specified period, sterility of one or both applicants and "proof of an emergency" (which is ambiguous enough to cover almost any condition) are among the causes recognized as sufficient for setting aside the laboratory test requirement or physical examination or both. The waiting period may be shortened or waived in some states for similar reasons, especially in the case of pregnancy.

Many of the laws allow the examining physician to issue a certificate to an applicant in spite of positive laboratory tests, if in his opinion the person is in a noncommunicable stage of the disease. The problems of asymptomatic infections, of treated cases and of false positive reactions have assumed a good deal of importance in this connection. It appears doubtful, however, whether any of the current laws are so worded as to encourage many physicians to encounter the risks of later developments and sign a certificate in spite of a positive laboratory report.

The decision of an appropriate court, usually a county or circuit court, is the means most commonly authorized for securing the waiving of a premarital examination requirement. In a few states the state health commissioner or state board of health is the sole agency empowered to make such exceptions, while in other states both this means and court action are authorized.

The Virginia premarital measure has made an interesting new departure by permitting the examining physician to sign a certificate when one or both of the applicants is syphilitic, but only after (1) informing both parties of the fact, (2) discussing the possible consequences of the infection, (3) reporting them to the state health department and (4) securing the infected person's agreement to pursue treatment until dismissed. Failure to continue regular treatment then constitutes a misdemeanor, punishable by court action.

The complete lack of agreement with regard to the basis for granting exemption from premarital examination is not due to adjustment to different local conditions but results from uncertainty as to the most satisfactory basis. Round table discussions would do much to clarify the problems involved.

COMMENT

The shortcomings of the several premarital examination laws are presented here in no hypercritical spirit. It is important to realize that each such law has had a separate origin and that its final form is the net result of forces of opposition and of support which differed in each state. Moreover, in the most recently adopted measures it has been possible to profit by the experience gained with earlier ones. Each within its particular area has made a valuable contribution to the control of venereal infections.

Considered from the point of view of ultimate effectiveness, any public health measure should accomplish its objective with the least possible infringement on the normal activities of the citizenry. Few of the pre-

6. Personal communication to the authors from the Director of Local Health Services, Texas State Health Department.

nuptial laws can be said to conform fully with this principle as far as interstate marriages are concerned. Colorado and Wisconsin alone will permit the applicant from another state to be examined by a local physician and have the required laboratory tests made by a local laboratory. The statutes of California, Indiana, Tennessee and Utah cause little inconvenience, however, in requiring that the tests be made in a state health laboratory.

The same is true of Iowa's measure, which makes the additional provision that residents of states in which a similar law operates may fulfil the requirements of their own state if the examining physician will have the examination certificate notarized. As pointed out in section 4, a somewhat similar provision is made under the recently adopted Ohio law, with the important difference, however, that applicants from states which have no premarital examination enactment must travel to Ohio and there meet the requirements of the latter state, which include at least a five day waiting period between application for a license and its issuance. If the wedding is to be solemnized in a church, requiring publication of the banns, an additional wait of not less than ten days is necessary, since the minister is required by law to secure evidence that the examination requirements have been completed before his first publication of the banns. (The second publication must be at least ten days later.)

The law now operating in Kentucky makes it necessary that the out of state applicant arrive far enough in advance of the wedding ceremony to allow for an examination, laboratory tests and the securing of a license. While no waiting period is required, a clerical error, a hemolyzed specimen, an unexpected positive test or some other unanticipated obstacle occurring so short a time before the hour for the wedding will inevitably cause embarrassment and occasionally may provoke tragic consequences. Furthermore, such haste is incompatible with the sound advice given by some health departments that examinations be made far enough ahead of the wedding to allow time for solving the unexpected problems which sometimes arise.

The laws of Connecticut, Maine, Massachusetts, New Hampshire, Vermont and West Virginia are only slightly less restrictive, since each of these requires that an out of state examination be performed by one of its own licensees. Massachusetts, as noted, permits men in the armed services to be examined by commissioned medical officers. The average citizen of, let us say, Peoria, Ill., does not know how to go about discovering which doctors, if any, in his home city hold licenses to practice in West Virginia, where his intended bride lives. The difficulties which he will encounter in finding some one who can tell him just what requirements he must fulfil in order to be married in West Virginia are likely to make him feel that he is being unjustifiably hampered. His experience, moreover, may easily make him hostile to such public health legislation and perhaps to other phases of venereal disease control. The practice followed by the health departments of Illinois, North Carolina, Pennsylvania and Oregon of allowing an applicant from another state to have a local physician secure the specimens for laboratory tests, provided one of their own licensed physicians makes the physical examination, helps to avert some of the difficulties just referred to. It is essentially a makeshift arrangement, however.

In the early stages of the present trend, when only a few states had adopted premarital legislation, some of it ineffective, it was logical, perhaps, that the state health departments concerned should localize the machinery of enforcement within their own boundaries. With effective laws now operating in more than half of the states, with excellent laboratory facilities in nearly all of our state health departments and in many municipal and other local laboratories, and with equally well trained medical examiners in the several states, it is difficult to see what public health value is subserved by requiring a candidate to go to another state for examination before marriage.

The problems of interstate reciprocity in the acceptance of laboratory reports are less complex than those which relate to medical licensure. It has been pointed out that laboratory reciprocity is largely in the hands of state health departments, North Dakota being the only exception. The evaluation studies in the serologic examination of syphilis conducted by the U. S. Public Health Service furnish a basis for mutual recognition of state health laboratories. Whether reciprocity should at this time be extended to include local laboratories is a less urgent question, but it deserves further consideration. A nationwide program of evaluation studies for local laboratories under the auspices of the U. S. Public Health Service, but administered through the state health laboratories, has more than once been advocated and might provide a suitable basis.

Although six years of experience with the newer type of premarital legislation are now behind us, the 1941 crop of these laws succeeded in adding to the confusing diversity of procedural stipulations. It is axiomatic that no state is under obligation to use precisely the same measures as do other states for the promotion of public health within its own borders. In our opinion, however, the establishment of reasonably uniform requirements and procedures for interstate marriages is a goal which should be reached as quickly as legal and administrative barriers can be surmounted. The steps which must be taken to accomplish this end will hardly be the same in any two states, and without a well directed effort by health organizations it is unlikely that present differences will be satisfactorily harmonized. Some of the problems here discussed have been considered by public health groups during the past year or two. No comprehensive survey has been made, however, seeking to determine what requirements an ideal premarital examination law should embrace and what provisions hinder rather than help in the control of disease. A symposium or round table sponsored by a national organization interested in venereal disease control, or in public health generally, would be timely if the fruits of its discussions should become available well in advance of 1943 legislative sessions.

SUMMARY

Details of operation of the thirty premarital examination laws now in effect in the United States illustrate the difficulties which are in many cases imposed on those who cross state lines in order to marry. These difficulties arise chiefly from the lack of reciprocity in the acceptance (1) of laboratory reports from out of state laboratories and (2) of examination certificates signed by out of state physicians.

1800 West Fillmore Street.

REPAIR OF DEFECTS IN SKULL BY
READY MADE VITALLIUM PLATES

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CLEVELAND

The various methods for repair of defects in the skull have not been entirely satisfactory. This subject has been reviewed by Grant and Norcross.¹ In 1936, Charles S. Venable and his associates² made an experimental study of the reaction set up in the tissues by various substances placed in the body. Various metals were studied together with a number of the so-called rustless and noncorrosive steels. Every substance that was studied (with one exception) produced changes in the tissues, necrosis of bone and other electrolytic effects. One alloy, called vitallium, made of cobalt, chromium and molybdenum, did not produce any reaction in the tissues. According to the authors, their

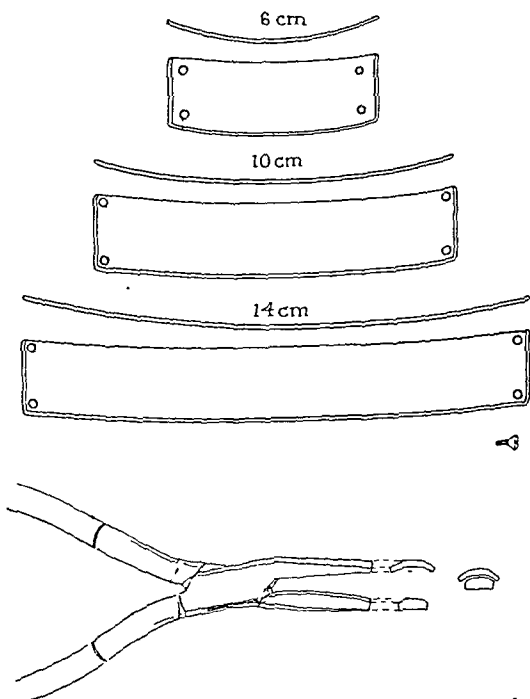


Fig. 1.—Ready made vitallium plates for repair of defects in the skull. The curvature can be altered by means of the pliers.

"experiments were repeated several times to check and recheck the apparent fact that this singular alloy seemed consistently to remain inert." These observations have proved to be of great practical value. Vitallium is now being used extensively in bone surgery.³ It was to be expected that neurosurgeons would try this alloy in the repair of defects in the skull, and in 1941 Geib⁴ published an account of his experiences in 3 cases in which special vitallium plates were used for the repair

of defects in the skull. A pattern of the defect was taken first and the plate was cast from this pattern. Geib found that these plates were satisfactory. They produced no reaction in the scalp or bone. They were entirely inert.

It occurred to me also that vitallium might be used for this purpose. I had the idea of using plates made

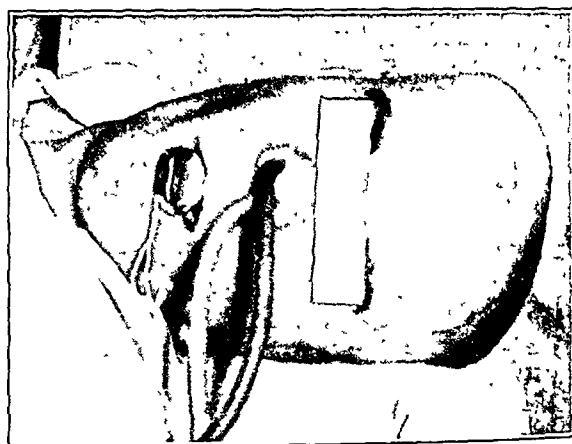


Fig. 2.—Patient with meningioma extensively invading the skull. He is shown under anesthetic just before operation.

up in various sizes and kept in stock so that the surgeon could use them when needed. Thus, when the skull was found to be invaded by meningioma so that a segment of skull had to be removed, the surgeon could take out the tumor and repair the defect in the skull at the same operation. This has been accomplished.

Almost any defect can be repaired by plates whose measurements are 6, 10 and 14 cm. in length and 2 or 3 cm. in width. Perhaps wider plates may be advantageous for certain defects. These plates have a gentle curvature which can be altered by means of pliers (fig. 1). Vitallium is not easily bent, and plates 1 mm. or less in thickness possess sufficient strength for this purpose. The plates should be bent so that they lie flat against

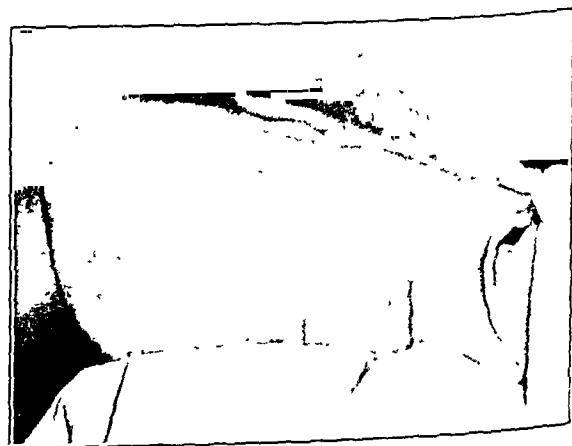


Fig. 3.—Posterior view.

the skull. They are attached by vitallium screws. The holes in the plates are countersunk. The screws are not easily placed in the bone unless a hole has been placed in the bone first. This is done by a small drill. The plates should be placed as close together as possible, so that the scalp will not sink between the plates. This happened in one of my cases and the space between

These plates can be obtained from the Austenal Laboratories, Inc., 34 West Thirty-Third Street, New York City.

From the Department of Surgery of Western Reserve University School of Medicine and University Hospitals.

Owing to lack of space, this article has been abbreviated by the omission of two illustrations. The complete article appears in the author's reprints.

1. Grant, F. C., and Norcross, N. C.: Repair of Cranial Defects by Cranioplasty, *Ann. Surg.* **110**:488 (Oct.) 1939.

2. Venable, C. S.; Stuck, W. G., and Beach, Asa: The Effects on Bone of the Presence of Metals Based on Electrolysis, *Ann. Surg.* **105**: 917 (June) 1937; *Tr. South. S. A.* **49**:294, 1937.

3. Venable, C. S., and Stuck, W. G.: Three Years' Experience with Vitallium in Bone Surgery, *Ann. Surg.* **114**:309 (Aug.) 1941; *The Use of Vitallium Appliances in Compound Fractures*, *Am. J. Surg.* **51**:757 (March) 1941.

4. Geib, W. S.: Vitallium Skull Plates, *J. A. M. A.* **117**:8 (July 5) 1941.

plates was estimated to be about 1 cm. The scalp did not sink in if the space between plates was a few millimeters.

These ready made vitallium plates have been used in 4 cases. The first ones were put in place sixteen months ago. They appear to be satisfactory. They have produced no evidence of tissue reaction. They



Fig. 4.—Appearance after operation, at which a large piece of the skull was removed.

remain firmly attached to the skull. The patients do not seem to be aware of the fact that they have metal plates in the skull. Figures 2 to 7 show a patient who had a very large piece of the skull removed because it



Fig. 6.—Plates covering the defect.

was invaded by meningioma. The defect was covered by plates at the primary operation.

This preliminary report on the use of stock plates is made because these plates might be useful in the care of war wounds. In the absence of infection it might be possible to repair skull defects of war wounds at the primary operation.

THE MANAGEMENT OF HEMOPHILIA

WITH LYOPHILE HUMAN PLASMA INTRA-
VENOUSLY INJECTED

JOHN B. JOHNSON, M.D.

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In recent years several agents have been proposed in the treatment of hemophilia. However, the most effective treatment today is still the transfusion of compatible blood.¹ There are certain inherent difficulties in this method which limit its use practically to critical emergencies for the patient with hemophilia. The typing of blood, which transfusion necessitates, automatically limits the number of possible donors among the acquaintances of the hemophilic family. The limitation becomes more acute as the number of transfusions increases, because of the development of intragroup incompatibilities, as recently discussed by Wiener and Peters.² The fact that whole blood cannot be preserved and stored for long periods is another limitation. The use of whole blood has saved the lives of patients with hemophilia, but it has done little to relieve the chronic disabilities due to repeated hemorrhages into the joints of these unfortunate patients.

For many years it has been known that the plasma of normal blood contains a substance effective in reducing the coagulation time of hemophilic blood to normal (Howell³). This substance has been shown to be associated with the globulin fraction of the plasma.³ Hitherto no practical method has been worked out by which the effective agent in plasma can be made generally available for therapeutic use.

This communication reports the effectiveness of dried human plasma in the management of hemophilia. Evidence is presented to show that plasma desiccated in a partial vacuum at a low temperature maintains its ability to reduce the coagulation time in hemophilia in a manner similar to that of fresh citrated blood. It has been shown that storage of the processed plasma does not destroy its thromboplastic activity. Typing and cross matching have been shown to be unnecessary. Five cases have been studied which demonstrate the effectiveness of this plasma in the management of hemarthroses, hematuria and tooth extractions in patients with hemophilia. One almost totally disabled patient to whom weekly injections of plasma have been given has been rehabilitated sufficiently so that he can do steady light work.

GENERAL PROCEDURES AND METHODS

The plasma was prepared by a modification of the lyophile method of Flosdorf and Mudd,⁴ which depends on the rapid dehydration of frozen plasma. Twelve to fourteen hours are required to desiccate 1,000 cc. of

Dr. Earle B. Mahoney gave advice and criticisms and permitted the use of his apparatus in the preparation of the plasma.

From the Department of Medicine, University of Rochester School of Medicine and Dentistry, and the Medical Clinics, Strong Memorial and Rochester Municipal Hospitals, Rochester, N. Y.

1. Howell, W. H.: Hemophilia, *Bull. New York Acad. Med.* **15**: 3, 26, 1939; McGavack, T. H.: Some Recent Advances in the Treatment of Hemophilia, *M. Clin. North America* **24**: 791 (May) 1940.

2. Wiener, A. S., and Peters, R. H.: Hemolytic Reactions Following Transfusions of Blood of the Homologous Group, *Ann. Int. Med.* **13**: 2306 (June) 1940.

3. Patek, A. J., Jr., and Taylor, F. H. L.: Hemophilia: II. Some Properties of a Substance Obtained from Normal Human Plasma Effective in Accelerating the Coagulation of Hemophilic Blood, *J. Clin. Investigation* **12**: 113 (Jan.) 1937.

4. Flosdorf, E. W., and Mudd, Stuart: Procedure and Apparatus for Preservation in "Lyophile" Form of Serum and Other Biological Substances, *J. Immunol.* **29**: 389 (Nov.) 1935.

plasma in the apparatus used. The product is a whitish yellow, porous material which readily dissolves in water or physiologic solution of sodium chloride. The plasma was separated from the citrated blood by centrifugation within two to three hours after the blood was drawn. Blood drawn for determination of the coagulation time was always taken from a vein different from that used for the injection of plasma or blood. The coagulation time was measured by the method described in a previous publication.⁵ The normal values obtained with this method range from six to twelve minutes. Just before injection the dried plasma was dissolved in physiologic solution of sodium chloride and given intravenously by means of a large syringe or a gravity set. In general, whenever the effects of plasma or blood on the coagulation time have been compared the same donor has been used for each group of experiments.

EXPERIMENTAL DATA

Lyophile plasma affects the coagulation time in hemophilia in a manner similar to that of fresh whole blood. In chart 1 is a comparison of the effect of fresh citrated blood and that of dried plasma on the coagulation time

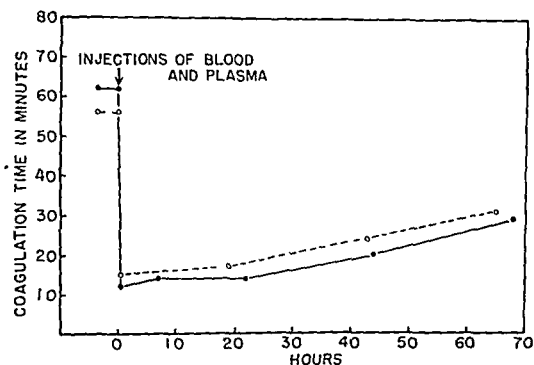


Chart 1 (case 5).—Effect of fresh citrated blood and lyophile plasma on coagulation time in hemophilia. Solid line, citrated blood (150 cc), broken line, lyophile plasma (90 cc).

in case 5. The similarity in the extent of the reduction and the duration of the effect is clearcut. In this case the plasma had been stored for two weeks at 5 C. after being dried. It is to be noted also that the effect was immediate. The first test of the coagulation time in these experiments was routinely made half an hour after the injection of blood or plasma. In other experiments, in which the coagulation time was measured fifteen minutes after the injection, the effect was found to be practically maximal at that period.

The thromboplastic potency of plasma is greatest when the plasma is dried within the first few hours after removal from the donor. Table 1 outlines a representative experiment and shows the loss of activity under various conditions. The potency was tested by measurement of the coagulation time after intravenous injection of the plasma. All tests were made on the same patient. The blood used in this experiment was divided into three equal parts (80 cc. each). Part A was dried immediately, and, as may be seen from table 1, it had high thromboplastic potency. Part B was dried after the blood had been kept at 5 C. for seven days. Part C was separated from the cells at the same time as part A, but the plasma was allowed to stand at 5 C. for

twenty-one days, and it was then dried. The loss of potency in parts B and C is apparent from the table.

The thromboplastic activity of dried plasma appears to be stable at 5 C. Chart 2 shows the effect of aging on the activity of dried plasma. The plasma was divided into two parts (120 cc. each), and both were dried immediately. One part was tested two days later, and

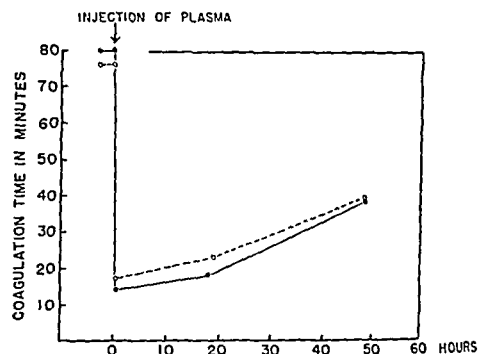


Chart 2 (case 1).—Effects of aging on thromboplastic activity of lyophile plasma. Plasma (240 cc) divided into equal parts; both lyophilized immediately. Solid line, plasma injected after two days at 5 C., broken line, plasma injected after ninety days at 5 C.

the other part was tested after having been kept ninety days at 5 C. The potency of the two preparations was practically the same. This fact makes it possible to utilize plasma from therapeutic phlebotomies whenever they occur and thus allows the accumulation of considerable stores of active plasma.

The period over which the injected plasma affects the coagulation of blood in patients with hemophilia varies within certain limits with the dose. Chart 2 shows the period over which the coagulation time was reduced when a 120 cc. dose of plasma was given. The curve is similar to that obtained when a 250 cc. dose of fresh citrated blood was used. Approximately 250 cc. of fresh citrated blood appears to be the optimal dose for an adult during a given twenty-four hour period. The

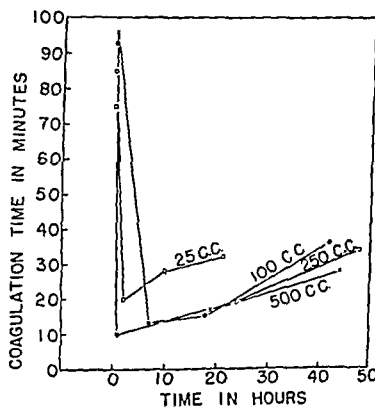


Chart 3.—Effectiveness of whole blood in varying quantities on coagulation time in hemophilia.

4 The 25, 100 and 250 cc. doses all were taken from the same donor. Because of this experience I use 125 to 150 cc of plasma as the average dose to be given at one time.

Typing of the plasma has been shown to be unnecessary.⁶ One of my patients (with blood of type A)

5 Johnson, J. B.: Effect of Oxalic Acid Given Intravenously on the Coagulation Time in Hemophilia, *Proc. Soc. Exper. Biol. & Med.* **46**: 496 (March) 1941.

6 Elliot, J. A. Preliminary Report of a New Method of Blood Transfusion, *South Med. & Surg.* **98**: 643 (Dec.) 1936. Strum, A. M., Wagner, J. A., and Monaghan, J. F. The Intravenous Use of Blood and Plasma, Fresh and Preserved, *Ann. Surg.* **111**: 623 (April) 1941.

repeatedly has been given plasma in 125 cc. doses from donors with blood of types O and B and has not had a reaction. Approximately one hundred injections of untyped nonpooled plasma have been given the 5 patients, with only one reaction (to be described).

CLINICAL DATA

I have used lyophile plasma in the management of hemarthroses, hematuria and tooth extractions and as a prophylactic against recurrent hemorrhage in patients with hemophilia. In several instances of hemarthrosis the patient indicated beginning relief of symptoms referable to the joint within a few hours after the plasma was injected. Improvement continued rapidly to complete healing. Occasionally an additional injection of plasma was necessary. Hematuria also responds promptly. In patient 4 gross hematuria developed the day before admission to the hospital. On the day of admission the hematuria was massive and the coagulation time was eighty-five minutes. The patient was given 200 cc. of plasma during the first twenty-four hours. At the end of thirty-six hours the hematuria was greatly reduced. At the end of forty-eight hours the urine showed no gross blood, and twelve hours later the guaiac test was negative. In a subsequent attack of hematuria this patient was treated with plasma while ambulatory, with the result that hematuria lasted several days longer than in the first attack. In previous experience with hematuria of this severity the duration of illness was usually two to three weeks when blood transfusions were not given.

One of the most satisfying results of the type of management under discussion has been the elimination of the fear of tooth extractions in patients with hemophilia. The removal of two or more teeth on three occasions in 2 patients was managed by the use of plasma alone. A dose of 150 cc. of plasma reduced the coagulation time to normal. Immediately one to three teeth were extracted, and the sockets were packed with the dry plasma. During the next few days plasma was given daily. The attempt was made to give enough plasma to keep the coagulation time at twenty minutes or less. In my earlier experience with tooth extractions in patients with hemophilia I found that postoperative hemorrhage invariably began when the coagulation time was allowed to exceed twenty minutes. Table 2 summarizes the data on the extraction of two teeth in 1 of

activity had been greatly restricted because of recurrent hemorrhages. During treatment his activity was greatly increased and he was able to do light work. As a rule his coagulation time was near normal during the first twenty-four hours after the injection, gradually rising to about sixty minutes at the end of six days. During the greater part of the treatment he was completely free of hemorrhages.

TABLE 2.—Management of Tooth Extractions in a Patient with Hemophilia by Means of Lyophilized Plasma Given Intravenously

Day	Coagulation Time, Min.		Plasma Given Intravenously, Cc.	Red Blood Cells, Millions	Hemoglobin, Gm.	Comment
	Before Plasma	After Plasma				
1	60	..	None	4.9	12.6	2 teeth extracted.
		..	150	...	....	Slight bleeding
2	18	12	150	...	....	No bleeding
3	19	..	125	...	....	No bleeding
4	19	..	125	...	....	Slight bleeding
5	..	..	None	...	....	Slight bleeding
6	25	..	125	...	....	Slight bleeding
7	22	..	125	4.8	13	Slight bleeding
8	36	..	125	...	....	Discharged

COMMENT

About one hundred injections of plasma have been given to 5 patients without typing. A reaction was encountered from the use of plasma from only one of the donors. This consisted of a chill and a rise in temperature lasting about one hour. The donor had blood of type B; the recipient, of type A. Subsequent study of the donor revealed that he had a high hemagglutinin titer (1:200). An attempt was made to remove the agglutinins by incubating some of the plasma of the donor with cells from the recipient for three hours at 5 C. This was only partially successful, in that the patient still had a slight rise in temperature and felt chilly, although he did not have a real chill, as when the first two parts of the plasma were given. My experience indicates that untyped plasma is safe for general use, even though one is likely to get transfusion reactions with plasma from exceptional donors with hemagglutinins in high titer.

The plasma protein level has been measured on three occasions in case 4. The patient had been getting intravenous injections of plasma at weekly intervals for five months, during which a tendency of the plasma proteins to increase was not noted.

In order to determine whether the process of freezing and drying would result in effective liberation of thromboplastic substance from the platelets in hemophilic blood, the plasma from 400 cc. of the blood of 1 of my patients was dried. Two days later this plasma was reinjected. No change was observed in the coagulation time, the control time being eighty minutes, and one hour after the reinjection the coagulation time was still eighty minutes. Thus it appears that the lyophile process does not increase the thromboplastic properties of hemophilic plasma.

It seems probable that in large medical centers fresh plasma can be secured in sufficient quantities and properly prepared so that the management of hemorrhages and operative procedures in persons with hemophilia can be greatly facilitated. I have not attempted to treat all my patients by injections at regular intervals because of the limited supply of plasma. It appears that the intensive treatment of incipient hemorrhages with plasma is the most practical method in the effort to rehabilitate patients with hemophilia.

TABLE 1.—Loss of Thromboplastic Activity of Plasma with Aging

Plasma *	Coagulation Time, Min.			
	Control	½ Hour After Plasma	2½ Hours After Plasma	48 Hours After Plasma
A	68	15	31	53
B	65	25	50	60
C	68	20	50	

* Plasma A, lyophilized immediately; plasma B, from seven day old blood; plasma C, lyophilized after twenty-one days.

my patients. The effectiveness of this method of preventing hemorrhage is apparent from the fact that the red cell count and the hemoglobin content were essentially the same seven days later as they were before the extraction.

An effort has been made to rehabilitate a patient totally disabled by hemophilia with weekly injections of 125 cc. of plasma for three months. This patient without therapy usually had a coagulation time of about one hundred minutes. During the previous three years his

CONCLUSIONS

1. The intravenous injection of a solution of human plasma which has been frozen and dried within a few hours after removal from the donor decreases the coagulation time in hemophilia, as does the administration of fresh citrated blood.

2. The thromboplastic activity of lyophile plasma is maintained for at least three months when the plasma is kept at 5 C.

3. Such plasma can be given safely, irrespective of the type of the blood of the recipient or of the donor.

4. The foregoing facts make possible the accumulation of stores of plasma suitable for the treatment of hemophilia.

5. Lyophile plasma simplifies the management of hemophilia. It has aided in the rehabilitation of seriously disabled patients when given in frequently repeated injections. It is of great benefit in meeting the many critical emergencies in the lives of such patients.

DESCRIPTION OF PATIENTS

CASE 1.—A man aged 41 had a family history of hemophilia, 1 brother having the disease. He had numerous episodes of hematuria and joint hemorrhages. He had several ankylosed joints. The blood calcium and fibrinogen levels and the prothrombin time were normal.

CASE 2.—A boy aged 12 years, 1 of 3 persons of the present generation with hemophilia, had a family history of hemophilia. He had repeated joint hemorrhages and many prolonged episodes of bleeding from minor injuries.

CASE 3.—The patient, a man aged 43, was a brother of patient 1. The history and the laboratory data were similar. Since infancy he had had episodes of hemorrhage.

CASE 4.—A youth aged 20 with a family history of hemophilia had repeated joint hemorrhages, the first episode having occurred at the age of 9 months. There had been excessive bleeding from minor injuries since infancy. The blood calcium and fibrinogen levels were normal.

CASE 5.—A man aged 26 with a family history of hemophilia had his first hemorrhages at the age of 3 weeks. Later he had a severe hemorrhage after circumcision. There were repeated episodes of hemorrhage into the gastrointestinal tract, joints and muscles. He had several episodes of hematuria, epistaxis and laryngeal hemorrhage. The blood calcium and fibrinogen levels and the prothrombin time were normal.

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Chromosome Chemistry.—The cell nucleus consists of chromosomes, which are enormously extensible protein fibers shown by digestion to resemble the protamines and histones making up the bulk of sperm heads. To these fibers or, rather, to specific points on them, the chromomeres, are attached deoxyribose-, or thymo-, nucleic acid, which is responsible for the specific aldehyde reaction given by the chromosomes in Feulgen's test. Underlying the cycle of mitosis and cell division is a cycle of attachment and detachment of this nucleic acid to and from the chromosomes. This goes with the cycle of coiling and uncoiling of their protein framework. The maximum attachment corresponds with the maximum spiralization of the chromosomes at metaphase of mitosis. At the other extreme, within the resting nucleus, they are uncoiled and relatively free from nucleic acid. At the end of every mitosis the chromosomes give up their nucleic acid charge and at the same time secrete nucleoli which dissolve at the beginning of the next mitosis when the chromosomes are taking up nucleic acid again. These nucleoli contain no thymo-nucleic acid, but instead the ribose form which is characteristic of cytoplasm and of viruses.—Darlington, C. D.: *Chromosome Chemistry and Gene Action*, *Nature*, Jan. 17, 1942, p. 66.

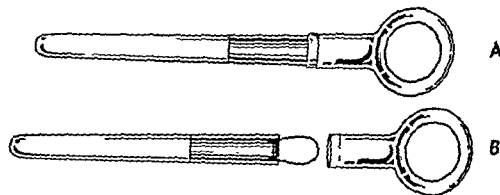
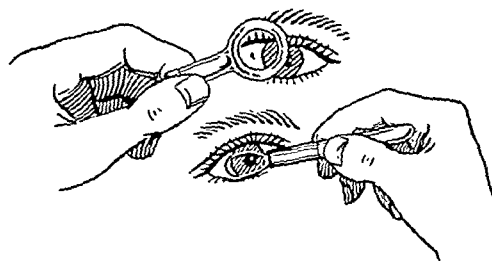
Clinical Notes, Suggestions and New Instruments

A PRELIMINARY REPORT ON A NEW EYE PARTICLE REMOVER

JOSEPH B. BIEDERMAN, M.D., CINCINNATI

All physicians have had many occasions to remove foreign bodies from the eye. At times it is difficult to find the particle, and a magnifying glass then becomes of great help in locating the foreign body. If the mass happens to consist of a metal which is capable of being magnetized, a magnet is used to loosen the particle before it is removed. A cotton swab is most frequently used to perform the mechanical removing. Sometimes a small portion of the cotton remains in the eye when the particle is removed. Cotton and handkerchiefs, when placed under the low power magnification of the microscope, are seen to have many rough projections that are capable of irritating the inflamed conjunctiva.

My object in this report is to describe a new device which has been found extremely useful for the removal of foreign bodies from the eyes.



A, appearance of the eye particle remover; B, plastic magnifier and magnetized loop pulled apart. A particle in the eye is located and magnified and removed by the magnetized loop.

The illustration shows this eye particle remover, closed and open. The particle is located and magnified by the plastic magnifier and then removed by the smoothened, magnetized loop.

This device consists of a plastic magnifier and a special, finely rounded magnetized wire loop, which in turn is attached to a magnetized metal plug. The magnifying portion is composed of a plastic material so that it will not break when dropped. The smoothened wire loop is magnetized so as to attract small metal particles embedded in the eye. Large, deeply embedded, magnetizable metal particles will require the use of a larger magnet, but the smaller, superficially located particles can be removed with this instrument.

These small, superficially placed foreign bodies are attracted by the magnet and at the same time are mechanically removed by the special smoothened wire loop. Nonmetallic particles are mechanically removed by the smooth wire loop.

SUMMARY

The new plastic eye particle remover described is composed of a plastic magnifier and a magnetized, smoothened wire loop. The particle is located by the nonbreakable plastic magnifier and then removed by the smoothened wire loop. Small, superficially located, magnetizable metal particles are loosened by the magnetized wire at the same time that the particle is being mechanically removed by this looped wire.

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A REMARKABLE CASE OF SPINAL METASTASIS IN
A CEREBELLAR MEDULLOBLASTOMA

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The following observation seems to be of interest to neurologists as well as to surgeons:

H. D., a boy aged 7 years, started complaining of headaches and vomiting one and a half years before the present admission. In the course of the following few weeks equilibrium disorders appeared. The neurologic examination revealed in the erect position and while walking moderate ataxia with no evident lateralization and bilateral nystagmus. The ophthalmoscope revealed bilateral edematous papillae of 2 diopters which rapidly reached 3 diopters. On the basis of these findings a cerebellar tumor, probably situated in the vermis, was diagnosed and operation recommended. On operation (Professor Vincent of Paris) a medullary blastoma was found in the midline of the cerebellum. The greatest part of the tumor was removed. After this the boy received several roentgen treatments.

Following the operation the general symptoms of cerebral compression disappeared completely and the ataxia has greatly improved. During this period the boy's condition was satisfactory. Three months before the present admission, i. e. fifteen months after operation, the boy began complaining of severe pain in the small of the back with irradiations of the pain in the legs becoming more acute on walking. At the same time he began urinating less frequently, although the total quantity of urine did not decrease. On examination a strongly positive bilateral Lasègue sign was present and absence of the right Achilles reflex was found.



Fig. 1.—Roentgen appearance of spine showing dense shadows of silver clips.

The spontaneous pains in the back and legs, the impairment of bladder function and the disappearance of the Achilles reflex led to the suspicion of a pathologic process in the cauda equina. An unexpected finding on roentgen examination explained the syndrome. At the level between the fifth lumbar vertebra and the sacrum, two double edged dense shadows 0.5 cm. long

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were seen (fig. 1). The supposition that the shadows were produced by Cushing's silver clips used in the operation was confirmed by the roentgenogram of the skull, which showed a number of similar shadows (fig. 2).

It was apparent that these were Cushing's silver clips which had been detached from the site of the operation on the cerebellum and had fallen into the vertebral canal, fixing them-



Fig. 2.—Roentgen appearance of skull showing dense shadows similar to those in the spine.

selves on the nerves of the cauda equina. The roentgenogram of the spine in different positions showed the clips to be fixed at the aforementioned point. There was thus reason to believe that the symptoms of a caudal lesion were caused by these clips.

In the meantime, the child's condition greatly deteriorated. The pains in the back and in the legs increased in intensity. In the right leg, weakness of the peroneus muscle was noticed. The Achilles reflex disappeared also in the left leg. Because of this development an operative intervention was considered. At the beginning, an operation with the object of removing the clips was thought inadvisable for the following reasons: Persistent vomiting set in at about the same time as the spinal manifestations. The vomiting was considered a symptom of cerebral pressure following renewed neoplastic growth in the cerebellum. It was reasonable to assume that the detachment of the clips from the site of operation was not accidental but a result of increased cerebral pressure. My associates and I were reluctant to recommend a second operation on the spine in this case, which as far as life was concerned was hopeless. Pressed by circumstances we had to operate on the child.

The surgical intervention (Dr. Marcus, of Tel Aviv) revealed an unexpected finding. Laminectomy performed at the level of the fourth and fifth lumbar vertebrae showed the dural sac totally filled with neoplastic tissue. This on histologic examination was found to be a medulloblastoma. Biopsy thus proved that the cauda syndrome was a consequence of spinal metastasis.

Spinal metastasis of a medulloblastoma of the cerebellum is not rare. Among 61 cases of medulloblastoma of the cerebellum reported by Cushing,¹ spinal metastasis of this tumor was found in 6 cases. In respect of the pathogenesis of this metastatic growth Cushing considered implantation of migrating tumor cells in the spinal meninges. He warned against any kind of manipulation that could favor this process, such as lumbar puncture. Our case is remarkable in that the silver clips appear to have acted as the intermediate factor. It may be assumed that tumor cells were detached, together with the clips, and were responsible for the new formation in the spinal space. It may thus be concluded that Cushing's warning as to the factors that may favor spinal metastasis of a medulloblastoma of the cerebellum applies also to the silver clips he introduced in surgery of the brain.

1. Cushing, Harvey: Experiences with Cerebellar Medulloblastomas, *Acta path. et microbiol. Scandinav.* 7: 1, 1930.

Special Article**CUTANEOUS DETERGENTS**

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NOTE.—This article is published under the auspices of the Committee on Cosmetics.—Ed.

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I. INTRODUCTION

The use of some cleansing agent with water is necessary to maintain satisfactory skin hygiene. While a survey of the literature reveals some articles on skin cleansing, especially with regard to soap, little has been done to determine the most satisfactory method of cleansing the skin or to learn what effect cleansing processes have on the skin itself. An attempt to cite all available references would lead to useless duplication. Wherever possible, papers are cited in this presentation which include complete bibliographies and which have been published in readily available American or

English periodicals. A symposium¹ on the subject of cleansing the normal and abnormal skin was held in 1934 in Germany, but in general even the dermatologic textbooks devote an insignificant amount of space to the subject. Physicians in general give the matter little thought. One is apt to assume that a patient keeps up satisfactory skin hygiene, and the usual advice on cleansing is very general and does not take into consideration the wide variation in individual skins and the difference in cleansing agents.

Although soap has been known and used as a detergent for centuries, its almost universal use dates only from the time when it became possible to produce alkali cheaply, perhaps early in the nineteenth century. But some skins do not tolerate soap well. The dermatologist often finds it advisable to substitute some other method for cleansing abnormal skins. The type of "dirt" to be removed in many industries requires other cleansing methods. The cosmetic manufacturers and their followers advise additional and often superfluous methods:

Within the last few years a number of new detergents have been developed and some have been used alone or with other materials for cleansing the skin. These detergents were developed primarily to be used in connection with the manufacture of and laundering of textiles. Hence, much of the literature on the subject of detergency is concerned with textiles and will be referred to in this paper when it is felt that it may apply to the skin as well as to textiles and particularly when some phase of the subject is discussed for which the only literature available deals with textiles. The term "soil," used throughout the paper, is borrowed from the textile chemists to indicate any and all substances removed from the skin during the process of cleansing. After surveying the literature on cleansing the skin, it seems advisable to discuss, first, the physical structure of the cutaneous surface and some of the pertinent physiology of the skin; second, the physical and chemical nature of the "soil" to be removed; third, the physical and chemical characteristics of the various detergents and their methods of cleansing, and, fourth, the action of these detergents on the skin itself.

II. PHYSICAL STRUCTURE AND CHARACTERISTICS OF THE CUTANEOUS SURFACE

Over the entire area of the body, the limiting surface of the skin is a continuous, relatively smooth layer of dead, flattened, keratinized cells, the last stage of the normal epidermal cell. Macroscopically this surface is made somewhat irregular by "ridges and furrows" of various size, shape and depth, by the orifices of the sweat glands and hair follicles and by outgrowths of hair. Microscopically it is made irregular by the intercellular spaces and by the continuous desquamation of the cells of the stratum corneum. The absolute limiting boundary between man and his environment, however, is not this outer layer of cells of the stratum corneum but the products secreted by the cutaneous glands in the form of a film over these cells. This is true of the normal skin at all times except, perhaps, for a few minutes following a thorough cleansing which removes these secretions. The moisture of the sweat evaporates relatively rapidly, leaving behind the salt, urea and other substances which were dissolved in it. Of greater importance, however, is the sebum which is continually being produced and usually covers all areas of the skin, except the palms and soles. In a

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1. Symposium: Reinigung der gesunden und kranken Haut, Dermat. Wchnschr. 69: 956-968, 1934.

paper by Perutz and Lustig² experiments were reported which showed by conductivity measurements, staining reactions, microscopic examinations and heating experiments that the fat on the surface of the skin existed as a more or less uniform layer with cellular inclusions but no crystals or water. Two fat phases sometimes existed, but no emulsion was ever present.

These secretions of the skin play an important part in systemic temperature control. This control is partially accomplished by evaporation of the water of the sweat as well as by capillary changes. Under normal conditions the surface of the skin is continuously changing in response to both internal and external stimuli. Fresh secretions from the glands are always reaching the surface, especially after the removal of accumulated products by some cleansing process. Some of the secretions are being removed by evaporation. At the same time the secretion of sweat and sebum automatically cleanses, to a certain degree, the orifices of the sweat glands and hair follicles.

The surface cells of the skin are composed primarily of proteins, lipids and water. The protein is mainly keratin, which is insoluble in weak acids, weak alkalis and salt solutions. According to Wilkerson³ the isoelectric point of the protein is at p_H 3.70. This means that, if the outer layers of cells of the epidermis are brought into equilibrium with a solution having a p_H to either side of 3.70, swelling of the cells will occur. Pillsbury and Shaffer⁴ showed that the skin reacted more strongly to alkalis than to acids. In general, weak alkali solutions cause more decomposition of keratin than do much stronger acid solutions. Since wool and silk are composed of proteins similar to the skin proteins, the chemical and physicochemical reactions of the textiles, made from wool or silk, with acids and alkalis may be expected to simulate skin reactions. Even though composed of similar types of proteins, the surface layer of the skin obviously differs from wool or silk in that the skin is always changing as regards both its cells and its glandular secretions.

Using colorimetric methods and various electrometric methods, such as hydrogen, quinhydrone and glass electrodes, many investigators, including Sharlit and Scheer,⁵ Schade and Marchionini,⁶ Marchionini,⁷ Lustig and Perutz,⁸ Levin and Silvers⁹ and Blank,¹⁰ have definitely proved that the surface of the normal skin has an acid reaction. The p_H has been reported to range from 3.5 to 7.0. This acid reaction and acid isoelectric point for keratin may be of some importance in determining the most desirable p_H for detergents.

2. Perutz, A., and Lustig, B.: Ueber den physikalisch-chemischen Zustand des Fettes der Hautoberfläche, *Dermat. Wehnschr.* 97: 1016-1017, 1933.

3. Wilkerson, V. A.: The Chemistry of the Human Epidermis: II. Isoelectric Points of the Stratum Corneum, Hair and Nails as Determined by Electrophoresis, *J. Biol. Chem.* 112: 329-335, 1935.

4. Pillsbury, O. M., and Shaffer, Bertram: Cutaneous Reaction with Reference to the Surface p_H , the Reaction to Ointments and Solutions of Different p_H and the Effect of the Skin in Modifying the p_H of Applied Solutions, *Arch. Dermat. & Syph.* 39: 253-267 (Feb.) 1939.

5. Sharlit, Herman, and Scheer, Max: Hydrogen Ion Concentration of the Surface of Healthy Intact Skin, *Arch. Dermat. & Syph.* 7: 592-598 (May) 1923.

6. Schade, H., and Marchionini, A.: Zur physikalischen Chemie der Hautoberfläche, *Arch. f. Dermat. u. Syph.* 154: 690-716, 1928.

7. Marchionini, A.: Untersuchungen über die Wasserstoffionenkonzentration der Haut, *Arch. f. Dermat. u. Syph.* 158: 290-293, 1929.

8. Lustig, B., and Perutz, A.: Ueber ein einfaches Verfahren zur Bestimmung der Wasserstoffionenkonzentration der normalen menschlichen Hautoberfläche, *Arch. f. Dermat. u. Syph.* 162: 129-134, 1930.

9. Levin, O. L., and Silvers, S. H.: The Reaction of the Skin and Its Secretions in Eczema, *Arch. Dermat. & Syph.* 25: 825-834 (May) 1932.

10. Blank, I. H.: Measurement of p_H of the Skin Surface: II. p_H of the Exposed Surfaces of Adults with No Apparent Skin Lesions, *J. Invest. Dermat.* 2: 75-79, 1939; III. Measurements on the Arms of Children with No Apparent Skin Lesions, *ibid.* 2: 231-234, 1939; IV. Daily Variations for Adult Females with No Apparent Skin Lesions, *ibid.* 2: 235-242, 1939.

It should not be forgotten that there is a great deal of normal variation in the normal skins of different people, as well as differences in various body areas. Most people will classify their skins as either "oily" or "dry." This is probably a measure of the quantity and quality of the sebaceous secretion. The same environmental conditions will not produce the same amount of sweating on each of two individuals. Different environmental conditions will cause variations in the amount of evaporation which will take place. The amount, type and distribution of hair varies. There are obvious differences in texture, thickness and pigmentation of the skin. The variations from the allergic standpoint are multitudinous.

Lesions on the skin appreciably alter surface characteristics. The upper layer or layers of the skin may be entirely removed by some types of lesions or made thicker by other types. Fissures and excoriations will be deeper than the "furrows" occurring on normal skin, and the limiting boundaries of the fissures are not normal epithelium as are the boundaries of the "furrows" on normal skin. The characteristics of the normal secretions (sweat and sebum) may be changed. The secretions may be supplemented by blood or by a serous or purulent exudate. This exudate, after evaporation occurs, forms a crust, a type of surface never occurring on normal skin.

Comparison has been made between textiles and skin, but even the hairy areas of the skin are much less irregular than the complex surface of a textile, composed of spun and woven fibers. The total surface of all the individual fibers which go to make up a textile constitute its "active" surface and it is readily seen that this "active" surface is many times greater than the actual area of a piece of cloth. The "active" surface of a part of the skin, particularly of hairy skin, is likewise greater than the actual area, but the difference between the area and the "active" surface in the case of the skin is not nearly as great as in the case of textiles. Also the interstices from which soil must be removed, i. e. the orifices of sweat glands and hair follicles, are much less complex for the skin than for a piece of cloth. Hence, at least from the mechanical point of view, the removal of soil from the skin should be much simpler than the removal of soil from a textile.

III. TYPES OF SOIL

The term soil, as used here, includes those substances which reach the skin surface either from within the body (endogenous) or from the environment (exogenous). These substances may be classified as follows:

A. Endogenous soil:

1. Water.
2. Water-soluble substances (inorganic, organic).
3. Oil-soluble substances.
4. Insoluble substances:
 - (a) Cellular debris.
 - (b) Coagulated proteins.

B. Exogenous soil:

1. Water-soluble substances.
2. Oil-soluble substances.
3. Insoluble substances, including micro-organisms and parasites.

The sources of soil from within the body, for the normal skin, are sweat, sebum and desquamating epidermis. In pathologic conditions, to these sources must be added blood and lymph.

A. *Endogenous Soil.*—Water is common to sweat, blood and lymph, and these three fluids are the source

of the water-soluble substances deposited on the skin surface. The composition of sweat is not constant. Way and Memmesheimer¹¹ have compiled a complete review of the literature on sweat. The total solids in sweat seldom exceed 0.5 per cent; these solids are composed primarily of chlorides, sulfates and lactates of sodium and potassium, and urea. There may be traces of fat, albumin and phosphates. The volatile constituents are primarily water and traces of lactic acid and low molecular weight fatty acids. Even with excessive sweating, seldom more than 2,000 cc. of sweat is excreted in twenty-four hours and, if all the solids remain on the surface of the body after evaporation of the water, only about 10 Gm. of very soluble soil would be left and that would be distributed over the entire surface of the body.

Lymph and blood plasma contain more solids than does sweat. Blood plasma contains 8 to 10 per cent of total solids, of which about 1 per cent is inorganic. The inorganic substances are chlorides, sulfates, phosphates and carbonates of sodium, potassium, calcium and magnesium. The organic materials are primarily proteins with smaller amounts of carbohydrates and fats. The proteins compose the bulk of the crusts which form following evaporation of the water from serous exudates in some lesions. Although these proteins in the fresh exudate are either dissolved or in colloidal solution, after they have been formed into a crust they are not easily dispersible in water, and hence, in the outline, they have been listed separately from the water-soluble substances and called coagulated proteins.

The oil-soluble substances on the surface of the skin come from two main sources, the sebum and the epidermal cells, and a very small part from the sweat. It is difficult to separate the fatty material from these three sources, but this is of no importance for the present consideration. Emanuel¹² states that almost all of the oil-soluble substances come from the sebaceous glands and little or none from the epidermal cells or sweat. He also states that following removal of these substances with oil solvents they are not replaced to their original level even after two hours. Excretion does, however, appear to stop after a maximum level has been reached. Kooyman¹³ has ably reviewed and added original information to the subject of the chemical composition of the lipids of the skin surface. From 25 to 30 per cent of the lipid is unsaponifiable, less than one half of which is cholesterol. Over half of the sterol is present as sterol esters. Neutral fats and fatty acids compose the saponifiable part. About half of the fatty acid fraction is free fatty acid.

Some of the excretions of the skin are either malodorous at the time of excretion or become so some time after they have been excreted and have spontaneously decomposed or been subjected to decomposition by the bacterial flora of the skin. The odors of these excretions vary a great deal from person to person. The very fact that they can be detected by the sense of smell indicates that they must be volatile and hence might eventually be automatically removed from the surface of the skin. As a rule, however, various cleansing methods are necessary to hasten the removal of these odorous substances.

It should be stated here that sweat and sebum must not be thought of only as soil and materials to be removed. Both undoubtedly have some part to play in keeping the skin supple; they may aid in the protection against the invasion of micro-organisms, and the sebum may act as a water-repelling film as well as a precursor of certain vitamins. Therefore, although we may wish to remove some of the products of excretion of the skin glands, proper methods for cleansing the skin probably should not remove all of the sweat and sebum all of the time.

It must also be stated that processes of excretion do aid in keeping the skin clean. Way and Memmesheimer,¹¹ in referring to sweat, say "its cleansing effect is also remarkable and many a laborer, who never takes a bath or rarely washes more than the extremities of his body, is kept clean and healthy owing to the fact that he works hard enough at times to sweat profusely."

As the epidermal cells are pushed toward the surface and removed from all body fluids, the process of keratinization takes place; some autolytic processes may occur; the cells dry up and desquamate. This is the source of cellular debris on normal skin. In addition to this process, which in some pathologic conditions may become accelerated, the blood stream may be at times the source of some cells and cellular debris on the surface of the skin.

In some of the hairy areas the process of keratinization is relatively pronounced even on perfectly normal skins. The keratinized cells, together with the products of secretion of the numerous sebaceous glands, constitute "dandruff." Pathologic conditions may accelerate either of these normal processes or alter the characteristics of the sebaceous secretions.

B. Exogenous Soil.—The different types of soil, both inorganic and organic, which may reach man's skin from his environment are so numerous that it would be nearly impossible and of little advantage to list them individually. They come into contact with man's skin from the air, from his clothes and from all things which he touches. Many different types of soil are deposited on man's skin as a direct result of his occupation.

For a consideration of the removal of exogenous soil it is sufficient, however, to determine only whether the soil is water soluble, oil soluble or insoluble, since ease of removal and the method of removal to be used will depend to a large extent on the solubility and emulsifiability of the soil in the substance or substances used for cleansing the skin.

Various substances intentionally placed on the skin must be classified as soil for the purpose of this discussion, since after they have served their purpose they are removed by various cleansing methods. Included in this group are such materials as ointments for the treatment of skin diseases, cosmetics such as rouge, and theatrical make-up.

Objection may be raised to the inclusion of micro-organisms and parasites in this classification. It is felt, however, that since these are things which get onto the skin from the environment and since cleansing methods do remove some or all of them, it is correct that they be classified as soil. Among these are such organisms as the dermatophytes and the acarus, which actually get into the skin. No ordinary method of cleansing the skin will remove them.

Certain types of soil, such as silver nitrate, dyes and chrome or vegetable tannins, may undergo chemical reactions with the cutaneous constituents or be adsorbed

11. Way, S. C., and Memmesheimer, Alois: The Sudoriparous Glands: III. Sweat, Arch. Dermat. & Syph. 41: 1086-1107 (June) 1940.

12. Emanuel, S. V.: Quantitative Determinations of the Sebaceous Glands' Function, with Particular Mention of the Method Employed, Acta dermat.-venereol. 17: 444-456, 1936; Mechanism of Sebum Secretion, ibid. 19: 1-16, 1938.

13. Kooyman, D. J.: Lipids of the Skin: A Review, Arch. Dermat. & Syph. 25: 245-255 (Feb.) 1932.

by the skin. Under these conditions no method of detergence other than mechanical or direct chemical action will remove them.

It has been pointed out that the endogenous soil leaves a more or less continuous film on the surface of the skin all of the time. Most of the exogenous soil, therefore, will be deposited not on the true skin but rather on this oily film. It will be shown later, in the discussion of the mechanism of the removal of the soil, that the separation of the exogenous soil from the skin by this oily film probably simplifies the removal of the exogenous soil, since much of it will be removed when the oily film is removed.

The entire problem of cleansing the skin, however, is not simple. It is concerned with the removal of many substances, inorganic or organic, water soluble, oil soluble or insoluble, originating from within the body or from the environment. The surface from which these materials are to be removed, though not as irregular as the surface of most textiles, is nevertheless much more irregular than is at first apparent. The processes of cleansing are necessarily limited to those which will not irritate or injure the skin.

IV. TYPES OF DETERGENTS: THEIR CHEMICAL AND PHYSICAL CHARACTERISTICS AND THEIR MODE OF ACTION

The nature of the surface to be cleansed and the types of soil to be removed have been discussed. The various types of detergents and the mechanisms whereby they remove the various types of soil will now be discussed under the following classification:

- A. Brush, abrasives, powder and other mechanical agents.
- B. Air.
- C. Water.
- D. Oils.
- E. Oil solvents.
- F. Soaps.
- G. New detergents.

In the final section of this review, the action of these detergents on the skin itself will be discussed.

A. Brush, Abrasives, Powder and Other Mechanical Agents.—Soil can be removed from the cutaneous surface by mechanical means plus water. Such a cleansing method is seldom used alone, but, since mechanical action is a part of the mechanism whereby soil is removed by any other cleansing method, it is briefly mentioned first. Soil may be rubbed off by the scrub brush, the wash cloth, the towel, one's clothing and a razor. It may be flushed off by a strong stream of water. Abrasives such as sand and sawdust are common ingredients of many industrial cleansers. Inert powders may remove soil by virtue of sorption onto their surface. Mechanical removal of soil is probably a more important part of cleansing than is at first realized.

B. Air.—Air is seldom considered a detergent and probably, in the true sense of the word, should not be called a detergent; but the circulating air does remove by evaporation certain of the volatile materials previously classified as soil, namely water and some of the volatile acids such as formic and acetic.

It seems to us that too little attention has been given to the evaporation of water from the surface of the skin. Certainly the amount of water remaining on the surface of the skin influences the rate of reproduction of the micro-organisms which are on the skin. Also it is possible that the surface moisture plays some role in certain types of dermatoses. The temperature of the skin and relative humidity of the air are the main

factors which determine the rate of evaporation of the water from the surface of the skin. The rates of evaporation of various volatile soils increase as the temperature increases and their vapor pressures decrease.

C. Water.—Water has just been discussed as a type of soil which is removed from the skin. It is also, however, the one material which is common to most of the frequently used methods of detergence. At times it is used alone, but, more generally, various detergent substances are used in conjunction with water to aid in the removal of oil-soluble and insoluble soil.

When water is used alone it serves as a satisfactory detergent for removing the various water-soluble soils. Most of the water-soluble residues from the evaporation of sweat are easily removed by water. The water-soluble proteins, which have undergone change during coagulation, are not easily removed by water.

Water alone can act as a detergent only by dissolving the soil or by mechanically flushing it from the surface. It can dissolve only that part of the soil with which it comes in direct contact. Even some water-soluble soils are not easily "wet" by water (for example, boric acid powder) and it is the function of some of the detergents, which will be discussed later, to aid in establishing contact between the water and the soil. Once contact is established, the temperature of the water is probably the most important variable which influences solution; the solubility of most types of soil increases as the temperature is increased.

Many waters used for washing contain varying amounts of chlorides, sulfates and bicarbonates of calcium and magnesium (hard water) and these salts will be deposited on the skin if the water is left there and allowed to evaporate. Also a precipitation of insoluble materials may take place if a type of soil is present which will react with the salts in the hard water to form a precipitate.

D. Oils.—Liquid petrolatum or olive oil is sometimes recommended as a detergent. These materials will, of course, remove the oil-soluble soil by solution but not the water-soluble soil except as they may remove it mechanically. Oils are used most frequently as detergents by persons with "dry skins," by workers in certain industries in which the soil is oil soluble and by persons with some pathologic cutaneous condition for which soap and water are contraindicated. Also oils are satisfactory detergents for the removal of crusts from lesions.

As a substitute for cleansing methods which use water, the cosmetic manufacturers have popularized methods which use oils or oil and water emulsions, recommending them particularly for persons with "dry skins." Cleansing creams are mostly hydrocarbons alone (mineral oils and petrolatums). Cold creams are emulsions of fats, hydrocarbons and water, which may contain also spermaceti, beeswax, hydrous wool fat and almond oil. Vanishing creams are primarily stearic acid, stearic acid soaps and water. These materials remove oil-soluble soils by means of true solution of the soils. The creams which have water present may dissolve some of the water-soluble soil at the same time. When the cream used is an emulsion, it may be stated as a general principle that the cream will dissolve most easily that type of soil which is soluble in the external phase of the emulsion, if the emulsion does not break on application to the skin. That is to say, a water-in-oil emulsion, in which oil is the external phase, will dissolve oil-soluble substances more easily than water-soluble substances.

E. Oil Solvents.—The use of oil solvents for removing oil-soluble soil must be mentioned even though it is an infrequent detergent method. The alcohol rubs given the bedridden patient may dissolve some fatty materials from the surface of the skin. The alcohol in tincture of green soap may also act as a solvent. Industrial workers who get much oil and grease on their hands frequently use gasoline and other grease solvents for removing such soil. Painters often use turpentine for cleansing their skin. Klauder, Gross and Brown¹⁴ mention the many substances used by workmen for cleansing their hands.

Certainly more of the endogenous soil is oil soluble than is water soluble; i. e., the secretions of the sebaceous glands constitute a greater bulk than the solids in the sweat. Probably in the great majority of cases also a large part of the exogenous soil is either oil soluble or insoluble. If we were dependent, therefore, on solution alone for cleansing, any oil would be a more satisfactory detergent than water. Fortunately, however, since cleansing with oil leaves an unpleasant residual oily feel, we are not dependent on solubility alone for removing soil but can make use of emulsification and other principles for removing oil-soluble soils if we add detergents to the water. Soaps and the new detergents act in such a manner.

F. Soaps.—In his review of the soap industry, Ittner¹⁵ says "Few things have more primary importance to the individual than soap. Food, clothing and fuel for warmth in cold weather are absolute necessities to all of us, but so also is soap for cleansing the body and clothes and the maintenance of sanitary conditions of health. Soap has been in use so long in our homes . . . that it is taken as a matter of course."

Soap and water are used for cleansing the skin much more frequently than any other method. Yet few who use soap know much about its chemical or physical properties. Until recently, discussions of soap by the medical profession have been only in the most general terms, as for instance the statements of Foley¹⁶ that the characteristics of a good soap are that "(1) it should be made of the purest materials; (2) it should act as an emollient to the skin; (3) it should be free of excess alkali; (4) it should act as a detergent, cleaning and purifying the cutaneous surface, and (5) it should never irritate the cutaneous surface."

1. Manufacture. A mixture of fats, which under modern operating conditions may weigh up to 75 tons per single batch, is heated to about 100 C. To this mixture a water solution of an alkali (usually sodium hydroxide) is added very slowly with continuous agitation until a slight excess of alkali has been added. Heating is continued for many hours and then a solution of sodium chloride is added until the soap, that is, the mixture of salts of the fatty acids, forms a curd at the top of the mix. The solution underneath the soap layer is withdrawn and the soap undergoes several processes of purification and adjustment of alkalinity. The entire process up to this point is continuous and requires about one week to complete. Perfumes, dyes, fillers, excess fatty materials, preservatives or numerous special medicaments may be added in small amounts to toilet or medicinal soaps; builders are added to laundry

soaps; abrasives are added to special soaps, such as mechanics' hand soaps. Drying and various mechanical processes convert the soap into the physical state desired (bar, flakes, powder). It is thus seen not only that soap is itself a complex mixture of various chemicals but that to the soap itself a number of different substances may be added so that the final material, as used by the consumer, is very complex.

There is little excess free alkali in the toilet or laundry soaps being manufactured at the present time. Some years ago the manufacturers were not as careful to avoid the presence of residual free alkali and this led to the suggestion by Unna¹⁷ of "superfatting" soaps for the purpose of neutralizing this free alkali. Siebert¹⁸ showed, however, that the excess neutral fat does not react with any of the residual alkali. Klauder, Gross and Brown¹⁴ state that superfatting agents do not affect the alkalinity which results from hydrolysis during the use of the soap.

2. Chemical Composition. In reviewing the action of soap on the skin, in the final part of this paper, it will be necessary to refer to the chemical composition of the commercial soaps. Such a complex material is difficult to analyze. In general the manufacturer is reluctant to divulge his formula because of the possibility of disclosing valuable information to his competitors. The composition of any one soap may change, depending on the market price of the raw materials, though the manufacturer must maintain a relatively uniform product in order to hold the good will of the public. A single raw material, such as an oil, will vary in chemical composition from time to time. Specifications, such as those used by the United States government¹⁹ for the purchase of soap, permit the purchase of soaps which may vary somewhat in chemical composition.

Since there has been a recent comprehensive review of the composition of soaps with an extensive bibliography by Klauder, Gross and Brown,¹⁴ we will limit ourselves to brief tabulations of the general composition of the various types of soap, the fatty acid composition of the oils commonly used for soaps and the range of fatty acid percentages in toilet soaps.

According to Hilditch²⁰ and the United States government specifications,¹⁹ the various types of soaps may be made from the following oils:

A. Toilet soaps:

1. Mixture of nut oils and tallow, with or without a soft oil, such as cottonseed.
2. Practically exclusively nut oils.
3. Nut oils, tallow and/or hydrogenated cottonseed, whale, soya bean, and so on.
4. Palm oil and tallow.
5. Palm oil with a soft vegetable oil.

B. Shaving soaps:

1. Mixed nut oils and soft tallow.

C. Laundry cake soaps:

1. Tallow, cottonseed, coconut, palm kernel or hydrogenated fish and vegetable oils.

D. Laundry chip soaps:

1. Tallow, coconut and hydrogenated fish and vegetable oils.

E. Washing powders.

1. Palm oil and tallow.

14. Klauder, J. V.; Gross, E. R., and Brown, Herman: Prevention of Industrial Dermatitis, with Reference to Protective Hand Creams, Soap and the Harmful Role of Some Cleansing Agents, Arch. Dermat. & Syph. 41: 331-356 (Feb.) 1940.

15. Ittner, M. H.: The Soap and Detergent Industry, Indust. & Engin. Chem. 27: 756-758, 1935.

16. Foley, J. L.: The Use and Abuse of Soap, Montreal M. J. 23: 428-432, 1904.

17. Unna, P. G.: Ueber medizinische Seifen, Samml. klin. Vortr. Nr. 522. Abstracted Monatsh. f. Dermat. 4: 341-342, 1885; cited by Mayer.
18. Siebert, C.: Ueber die Reizwirkungen von Wascheifen und deren Beseitigung, Med. Klin. 18: 1059-1060, 1922.
19. Circular 62, United States Government Bureau of Standards, Department of Commerce, 1923.
20. Hilditch, T. P.: The Industrial Chemistry of Fats and Waxes, New York, D. Van Nostrand Company, 1927.

Originally the term "castile" was applied to a soap which was made solely from olive oil. If the manufacturer so desires, however, he may now use this term to designate soaps made from oils other than olive.

Hilditch²⁰ says "the exact composition of fats varies widely according to the genus and even the species of the fruit." The composition of the fat of a single species of animal may vary with the climate in which the animal lives. The ranges for the percentages of individual fatty acids in some of the fats used by the soap industry have been compiled into table 1.

Some American soap manufacturers have been willing to supply us with what they consider to be the fatty acid content of an average toilet soap. The ranges of these analyses are given in table 2.

As already stated, builders are present primarily in laundry soaps and are used in toilet soaps only in small amounts if at all. They usually are sodium phosphates,

ethanolamine soaps are "less alkaline" than the sodium soaps.

3. Physicochemical Characteristics. Only a brief summary of the physicochemical properties of soap solutions will be given. Soaps are only sparingly soluble in water. In solution, hydrolysis always occurs and, even though a soap may be made from chemically equivalent amounts of alkali and fatty acid or even a slight excess of the fatty acid, an alkaline solution results. This is because the strong alkali is more strongly ionized than the weak acid. In general, the greater the percentage of high molecular weight fatty acids present in a soap, the higher the alkalinity of the solution, other factors being constant. Pure soap solutions have a range of alkalinity equivalent to one-seven thousandth to one-three hundredth normal sodium hydroxide solution (approximately 0.0006 to 0.013 Gm. of sodium hydroxide per hundred cubic centimeters); p_H determinations

TABLE 1.—Composition of the Fatty Acid Fraction of Some Classes of Oils Which May Be Used for Soap Manufacture
(Figures Give the Ranges for the Percentages of Individual Acids)

Class of Oil	Seed Oils				Fruit Coat Oils	Animal Oils		
	Coconut; palm kernel	Pine, linseed; teneed	Cotton; corn; wheat	Castor		Lard	Beef tallow; Mutton tallow	Whale Oils
Examples								Sperm head; Sperm blubber
Major component acids	Lauric; Myristic; palmitic; oleic	Linoleic; linolenic; oleic	Palmitic; oleic; linoleic	Ricinoleic	Palmitic; oleic; linoleic	Palmitic; stearic; oleic	Palmitic; stearic; oleic	Palmitic; unsaturated C_{16} ; unsaturated C_{18}
Minor component acids	Caprylic; capric; stearic; linoleic	Palmitic	Stearic; linolenic	Oleic; linoleic	Myristic; stearic	Myristic; linoleic	Myristic; linoleic	Lauric; myristic; unsaturated C_{14} ; unsaturated C_{20}
Saturated								
Caprylic	3.9	..	..	..	..	..	..	..
Capric	4.7	..	..	..	..	..	..	..
Lauric	45.50	..	..	..	..	..	..	1.18
Myristic	15.18	..	..	..	1.4	1.4	1.7	5.14
Palmitic	7.9	5-10	10.23	..	10.50	20.28	21.30	6.20
Stearic	1.3			..	1.5	7.14	15.30	2.3
Unsaturated								
Palmitoleic	..	..	..	..	..	..	..	15.20
Oleic	5.18	10.50	25.45	7	40.60	35.60	36.48	17.40
Linoleic	1.2	30.50	40.50	3	5.12	1.15	1.5	
Linolenic	..	7.45	..	..	..	..	..	..
Hydroxy								
Ricinoleic	..	..	..	88	..	..	..	..

Compiled from Hilditch, T. P.: The Chemical Composition of Fats, New York, John Wiley & Sons, Inc., 1940.

silicates or carbonates. The new types of phosphates, which have been developed recently, are being substituted in part for some of the older builders. These materials increase the total available alkali in the soap. They differ from the inert fillers in that they enhance the detergent properties of soap solutions.

In American soaps, fillers are present in only small percentages. Sodium or potassium sulfates are found in soaps to the extent of approximately 0.5 per cent. Talc, clay, zinc oxide, titanium oxide and barium sulfate are used in fractional percentages in toilet soaps.

Almost all soaps are made from inorganic alkalis. Recently, however, the organic bases, particularly triethanolamine, have been used for the manufacture of some soaps. Fiero²¹ found that triethanolamine soaps in general were not as good detergents as the soaps of inorganic alkalis. Since triethanolamine is a weaker alkali than, say, sodium hydroxide, the water solutions of soaps made with triethanolamine have a lower hydroxyl ion concentration than do equimolecular solutions of sodium soaps, or, in other words, the tri-

ethanolamine soaps range from 9.0 to 11.0. Lustig and Schmerda²² have made a careful study of the solubility and hydrolysis of the sodium soaps of the individual fatty acids and mixtures of these soaps.

TABLE 2.—Composition of the Fatty Acid Fraction of an Average Toilet Soap

Caprylic	0 to 0.5
Capric	2.0
Lauric	10 to 2.0
Myristic	11 to 12.0
Palmitic	5 to 12.0
Stearic	18 to 25.0
Unsaturated	7 to 13.0
Older and other one double bond acids	38 to 40.0
More highly unsaturated acids	5 to 10.0

The presence of soap in solution always lowers the surface tension from 72.8 dynes per centimeter for distilled water at 20 C. to from 25 to 35 dynes per centimeter for the soap solutions.

21. Fiero, G. W.: Salts of Triethanolamine: II Detergency, J. Am. Pharm. A 28: 284-285, 1939

22. Lustig, B., and Schmerda, F.: Ueber die Löslichkeit der Natriumseifen. Ein Beitrag zur Pharmakologie der Seifenwirkung, Dermat. Wehnschr. 104: 607-613, 1937.

The osmotic pressures of soap solutions (up to 5.0 per cent) are moderately high, in general lying between the values obtained for nonelectrolytes, such as cane sugar, and those obtained for electrolytes, such as sodium chloride. Electrical conductivities are relatively high.

Both the osmotic and the electrical activity of soap solutions can probably be accounted for by the physical composition of the solutions. Soaps in solution exist as true electrolytes, colloidal electrolytes and neutral colloids, all present in reversible and reproducible equilibria. The simple ion is at times replaced by an ionic micelle (a fatty acid anion, combined with a fairly large number of molecules of neutral soap) which exhibits high conductivity and a great hydration.

4. Mode of Action. The mechanism whereby a soap solution removes oily soil or whereby soap aids water in removing oily soil from the surface of the skin is complex and not entirely understood but does make use of many of the physicochemical properties of soap solutions just mentioned. There is an extensive literature on this subject. It seems sufficient for the purpose of this discussion to cite only three major papers²³ which have appeared at about ten year intervals during the past twenty years. Each review has an extensive bibliography. The principles involved for soap are probably similar to the principles involved for the new detergents, and therefore they will be discussed only for soap.

The earliest explanation of how soap removes oily substances was that the alkali resulting from hydrolysis saponified the oils, thus making them water soluble. One still hears this explanation occasionally in spite of the fact that it was disproved some years ago. Saponification, i. e. the conversion of a glyceride into a soap and glycerin, takes place only when the fat is held at relatively high temperatures, in the presence of strong alkali, for long periods of time. None of these conditions apply to the customary cleansing with soap and water. Koppenhoefer²⁴ has recently shown that, in the presence of a much stronger alkali (saturated lime water in the liming of steer hides for leather manufacture) for long periods of time (five days) only the small phospholipid fraction of the epidermal lipids of steer hides is saponified. In cleansing our skins with soap and water we do not approach these conditions. If a soap should be used which had excess alkali, it might be possible that some of the free fatty acids of the natural skin fats would be neutralized; but the hydrolytic alkalinity of a neutral soap would not even do this and certainly it could not saponify any glycerides.

If instead of solubilizing the oily soil in water by saponification it can be stably suspended for a short period of time, it then can be easily removed. Emulsification of a fat is such a process, and many of the present day theories of the mechanism of detergency are concerned with the factors which favor emulsification. In order that the oil may be emulsified in the water it is first necessary for the oil and water to "come into contact" with each other. This is not as simple as it might at first seem, and substances which aid in establishing such a contact are termed "wetting agents."

A complete review of the various theories of emulsification and wetting would lead too far afield into colloid and physical chemistry. They are concerned primarily with surface tension, interfacial tension, orientation of molecules into monomolecular layers, McBain's theory of colloidal micelles, sorption, adhesion tension and contact angles. These factors vary for the soaps which have different detergent qualities. Bartell²⁵ has recently discussed the mode of action of the new detergents and has considered many of these factors.

An important property of all active detergents, as far as emulsification is concerned, is the presence of both a hydrophilic and a lipophilic radical in the molecule. The hydrophilic radical is attracted to the water, the lipophilic to the oil. Through some of the physicochemical phenomena that have been mentioned, this orientation of the detergent molecule aids in establishing contact between the water and the oily soil and in producing an emulsion of the soil in the detergent solution. This results in the rupture of the skin-soil interface and the establishment of two new interfaces, namely skin-detergent solution and soil-detergent solution. Cleansing takes place as a result of replacement of the emulsified soil by excess of the detergent solution and finally by solutions containing smaller and smaller quantities of the detergent, i. e. rinsing.

In soaps and also in many of the new detergents the lipophilic group is a hydrocarbon or slightly modified hydrocarbon group. In general the higher the molecular weight of the hydrocarbon group, the stronger its lipophilic properties. This may explain why soaps made from fatty acids of less than twelve carbon atoms are poor detergents. The hydrophilic groups of the more common detergents are as follows:

Soap: $-\text{COONa}$.

Sulfates: $-\text{OSO}_3\text{Na}$ or $-\text{OSO}_3\text{H}$.

Sulfonates: $-\text{SO}_3\text{Na}$ or $-\text{SO}_3\text{H}$.

Explanations of the mechanism of the removal of the insoluble soils make use of some of these same physicochemical principles. On the whole, however, much less work has been done on this problem. Some of the early workers felt that the insoluble particles were mechanically held on the material to be cleaned by the oily soils. The work of Spring,²⁶ however, in which he thoroughly removed all oil from fabrics and then soiled them with oil free insoluble materials such as lamp black, disproved this point. He felt that a sorption compound was formed between the soil and the fabric and that detergent solutions acted by breaking this compound and replacing it with sorption compounds composed of soil and the solution, and fabric and solution. He found that it is extremely difficult to rinse all the detergent from a fabric. Later workers²⁷ have actually determined the amount of soap adsorbed onto the fabrics under specified conditions.

Because of the natural oily film on the surface of the skin, there is probably little opportunity to form solid-skin sorption compounds, and the belief of the earlier textile workers that insoluble soil is removed by removing the oily film which holds it to the fabric probably applies to the great majority of cases of skin cleansing, and the problem of removal of insoluble soil from the skin itself is probably seldom met. The observation of

23. McBain, J. W.: Colloid Chemistry of Soap, in Third Report on Colloid Chemistry, British Association for the Advancement of Science, 1920, pp. 2-31. Fall, P. H.: Detergent Action of Soaps, *J. Physical Chem.* 31: 801-849, 1927. Symposium: Wetting and Detergency, International Society of Leather Trades' Chemists, British Section, New York, Chemical Publishing Company, 1937.

24. Koppenhoefer, R. M.: The Lipids of Steer Hide: The Effect of Liming on the Lipids of Steer Hide, *J. Am. Leather Chem. A.* 32: 210-230, 1937.

25. Bartell, F. E.: Wetting Agents, *Indust. & Engin. Chem.* 33: 737-740, 1941.

26. Spring, W.: Einige Beobachtungen über die Waschwirkung der Seifen, *Kolloid Ztr.* 4: 161-168, 1909; 6: 11-17, 109-111 and 161-164, 1910.

27. Phillips, H.: Some Detergent Problems of the Woolen and Worsted Industries, *Symposium: Wetting and Detergency*, p. 178.

these textile workers, however, that the detergent is adsorbed to the fabric may be very important in our consideration of the action of detergents on the skin. If, like fabrics, the skin adsorbs detergents, as it well might, then detergents cannot be completely rinsed from the skin with ordinary rinsing.

5. "Sterilizing" Action. The bacterial flora of the skin, for purposes of this discussion, has been considered a type of insoluble soil. It is probable that an explanation of the mechanism of the removal of insoluble dirt particles will also apply to the removal of bacteria.

The "sterilizing" action of detergents, usually soaps, has been studied by investigators in the field of skin hygiene more than any other branch of the subject of skin cleansing. General reviews of the germicidal value of soap were published by Diasio²⁸ and by Klarman.²⁹ Extensive investigations into the germicidal properties of pure soaps, usually in vitro, have been made in this country by Walker,³⁰ Tilley and Schaffer,³¹ Eggerth³² and Bayliss,³³ the first and last mentioned of these articles containing good bibliographies. Soaps of the saturated fatty acids have been shown to increase in their germicidal activity up to a maximum as the molecular weight of the fatty acid increases and subsequently to decrease as the molecular weight is further increased. Soaps containing twelve, fourteen and sixteen carbon atoms have maximum germicidal activity. Soaps of unsaturated and hydroxyl fatty acids have greater germicidal activity than saturated fatty acids of equal numbers of carbon atoms.

Most of these investigators were forced to conclude that the soaps are not very good germicides against some of the types of organisms present on the skin, particularly the staphylococci. This led other workers to investigate the part played by detergents, not in killing the organisms, but in mechanically removing them—a true detergent action. Norton³⁴ showed that a large number of bacteria remain viable for periods of time up to five hours and probably longer in rinse waters containing 0.5 per cent of soap. He also showed that soap solutions allowed to dry on the skin for five minutes did not sterilize the skin surface. From a more thorough investigation of the removal of microorganisms from the skin by studying the bacterial content of successive rinse waters, Price³⁵ has concluded that "the transient flora of the skin may contain any number of pathogenic bacteria, the resident flora relatively few. . . . Scrubbing with brush, soap and water removes the transient flora readily, but the resident flora far more slowly. Scrubbing (in the manner described) degerms the hands and arms at a regular, logarithmic rate that is constant irrespective of the size of the flora. This rate of reduction, roughly, is by one half each six minutes of scrubbing. The largest variable effecting this rate is the amount of vigor used.

in brushing; the sort of soap used and the sterility and temperature of the water washed in are less important." Price's work has recently been confirmed by Pohle and Stuart.³⁶

G. *New Detergents*.—When soaps are used with hard water, the fatty acids of the soaps combine with the calcium and magnesium salts of the water to form insoluble calcium and magnesium soaps. The latter soaps have no detergent value. When sodium soaps are used in the presence of acids stronger than the fatty acids from which they are made, these fatty acids and possibly acid soaps are precipitated from solution. In order to eliminate these two undesirable properties, new detergents have recently been developed which maintain their cleansing properties and do not precipitate in the presence of either calcium and magnesium salts or strong acids. These new detergents have recently been discussed and classified by Mullin³⁷ and Mack.³⁸ The former paper includes an extensive bibliography. Duemling³⁹ has recently discussed the use of these materials not as detergents but as materials to be used in preparing certain "cold cream" type ointment bases and for hastening the penetration of fats into the skin.

Many of these detergents are so new that their chemical compositions are not completely known and not much is known of their chemical and physical properties other than the generalizations about their stability in hard water and acid solutions as mentioned. A recent symposium⁴⁰ discusses some of the properties of surface-active agents, many of which are used as textile detergents and some of which are coming into use as detergents for the skin. This symposium includes a table of surface-active agents and gives both the trade names and chemical names so far as they are known. Attempt will be made here to do little more than to classify those detergents recently recommended for cleansing the skin and hair and those recommended for household laundering and dishwashing.

- I. Sulfonated⁴¹ oils. Oils, fats, fatty acids and waxes of animal or vegetable origin, which have been "solubilized" by treatment with concentrated sulfuric acid. Examples: Sulfonated⁴¹ olive oil; sulfonated⁴¹ oleic acid.
Skin detergents: Acidolate. Sulfolium. Sulfonated Castor Oil. Liquid Hand Cleanser. Dermalav. Mixtures recommended by Klauder, Gross and Brown.¹⁴
Shampoos: Admiracion; Mar-O-Oil.
- II. Sulfated alcohols. Fatty alcohols esterified by treatment with concentrated sulfuric acid. Example: Sulfated lauryl alcohol.
Skin detergents: Pragmol.
Shampoo: Drene.
Household product: Dreft.

28. Diasio, F. A.: Germicidal Value of Pine Soap, *M. Rev. of Rev.* 40: 423-431, 1934.

29. Klarman, E.: Antibacterial Properties of Soaps, *Soap* 9 (no. 12): 23-27, 107-109, 111, 113 and 115, 1933.

30. Walker, J. E.: The Germicidal Properties of Soap, *J. Infect. Dis.* 25: 557-566, 1924; 37: 181-192, 1925; 38: 127-130, 1926; *The Germicidal and Therapeutic Applications of Soap*, J. A. M. A. 97: 19-20 (July 4) 1931.

31. Tilley, F. W., and Schaffer, J. M.: Germicidal Efficiency of Coconut Oil and Linseed Oil Soaps and Their Mixtures with Cresol, *J. Infect. Dis.* 37: 359-367, 1925.

32. Eggerth, A. H.: The Effect of the pH on the Germicidal Action of Soap, *J. Gen. Physiol.* 10: 147-160, 1926; Germicidal Action of Hydroxy Soaps, *J. Exper. Med.* 50: 299-313, 1929.

33. Bayliss, M.: Effect of the Chemical Constitution of Soaps upon Their Germicidal Properties, *J. Bact.* 31: 489-504, 1936.

34. Norton, J. F.: Soaps in Relation to Their Use for Hand Washing, *J. A. M. A.* 75: 302-305 (July 31) 1920.

35. Price, P. B.: Bacteriology of Normal Skin: A New Quantitative Test Applied to a Study of the Bacterial Flora and the Disinfectant Action of Mechanical Cleansing, *J. Infect. Dis.* 63: 301-318, 1938.

36. Pohle, W. D., and Stuart, L. S.: The Germicidal Action of Cleansing Agents: A Study of a Modification of Price's Procedure, *J. Infect. Dis.* 67: 275-281, 1940.

37. Mullin, C. E.: The Newer Detergents, *Soap* 13 (no. 11): 30-33 and 74, 1937; 13 (no. 12): 27-30 and 73-74, 1937; 14 (no. 1): 30-33 and 74, 1938; *Synthetic Detergents*, *ibid.* 14 (no. 2): 32-35 and 73-74, 1938; 14 (no. 3): 30-33, 1938; 14 (no. 4): 32-33 and 73-74, 1938.

38. Mack, P. B.: Detergents and Detergency, *Nat. Res. Council Annual Survey of American Chemistry* 10: 341-358, 1935.

39. Duemling, W. W.: Wetting Agents: New Synthetic Chemicals of Use in Finer and More Efficient Topical Therapy, *Arch. Dermat. & Syph.* 42: 264-278 (Feb.) 1941.

40. Symposium: Surface Active Agents, *Indust. & Engin. Chem.* 21: 31-69, 1939.

41. All of the substances belonging to class I are referred to throughout this review paper as sulfonated oils because in the literature reviewed this term is used in references to these substances. In this class of compounds the sulfur is linked to carbon through the oxygen atom; this is a characteristic of the sulfates and not the sulfonates, in which the sulfur is linked directly to the carbon atom. In other words, the sulfate group is $-\text{OSO}_2\text{Na}$ and the sulfonate group is $-\text{SO}_3\text{Na}$. The correct chemical term is sulfated oils and it would be more desirable to use this term.

- III. Sulfated or sulfonated fatty esters or amides. Examples: Sulfated lauric acid amide; sulfated ethyl laurate; sulfonated lauric acid amide.
Skin detergents: Tersus; Lowila; Praecutan; ⁴² Satina.⁴²
Shampoo: Halo.
Household product: Vel.
- IV. Sulfonated alkylated aromatic hydrocarbons. Example: Sulfonated lauryl benzene.
Household products: Savex; Swerl.
- V. Sulfonated ethers. Example: Sulfonated lauryl phenyl ether.
Skin detergents: Substances mentioned by van Antwerpen.⁴³ Substances mentioned by Guild.⁴⁴
- VI. Sulfonated aliphatic di-esters. Example: Sulfonated di-octyl succinate.
Skin detergents: Mixture recommended by French.⁴⁵
- VII. Phosphated or borated fatty alcohols. Examples: Phosphated lauryl alcohol; borated lauryl alcohol.
- VIII. Sulfonated hydrocarbons. Petroleum hydrocarbons or their derivatives are "solubilized" by treatment with concentrated sulfuric acid. Examples: Sulfonated paraffin; sulfonated naphthenic acid.
- IX. Fatty amine salts. Fatty amines are "solubilized" by the formation of their salts. Examples: Lauryl amine hydrochloride, lauryl amine acetate.

It was stated that the mechanism of the detergent action of these new materials would not be separately considered. As far as is now known, they act as detergents by means of the same physicochemical principles as operate in the case of soap. Each possesses both a hydrophilic and a lipophilic radical; all are good wetting agents; all are surface tension depressors; they probably form colloidal micelles in water solutions; they are good emulsifying agents. The efficiency of two such agents, Praecutan and Satina, in removing soil from the surface of the skin has recently been reviewed by Schmidt and Straub.⁴²

The only one of the previously mentioned investigators working on the action of soap on bacteria who also studied the action of one of these new detergents was Bayliss.³³ He found that sodium lauryl sulfate has antiseptic powers approximately equivalent to those of soaps. Baker, Harrison and Miller,⁴⁶ using the Warburg apparatus, have studied the action of these new detergents on the metabolism of bacteria. Of the several classes of these materials mentioned, they found representative compounds of class IX to be the most effective inhibitors of bacterial metabolism.

It has been shown that the various types of soil may be removed by air, water, oils, oil solvents, soap and water or the new detergents and water. Mechanical action, evaporation, solution, emulsification, suspension and sorption are the most important principles concerned with the removal of soil from the cutaneous surface. Even though a major part of the soil is oil soluble or insoluble, water is the most commonly used substance for removing the soil. Soap is by far the most commonly used substance to aid in removing this soil. Emulsification is probably an important part of the mechanism whereby soap aids in the removal of soil. Soaps are efficient and cheap detergents and satisfac-

tory, except for the relatively few persons who, as will be seen in the next section of this review, are appreciably irritated by soap. If some of the new detergents, which have only recently been shown to be satisfactory detergents for the skin, can be produced cheaply and can be shown to be less irritating to the skin than soap, they will probably be used by an ever increasing number of people.

V. ACTION OF DETERGENTS ON THE SKIN

In the preceding sections of this review the nature of the surface to be cleansed, the types of soil to be removed, the detergents used and the mechanisms whereby these detergents remove the soil from the cutaneous surface have been discussed. In this, the final, section the action of the detergents on the skin itself will be considered. Relatively little attention has been paid to this phase of detergency and little information can be obtained from other fields, as was the case with other phases of this problem, in which the textile literature was helpful. Most of the few studies which have been made have been concerned with the action of soap on the skin, but the action of water, oils and the new detergents on the skin have interesting aspects and will be reviewed briefly.

From a physiologic point of view the effects on the skin should be considered with regard to the detailed action of the various detergents on blood vessels, secretions and sensations. Up to the present time, however, not enough investigative work of this nature has been completed to justify a review from this point of view. Practically speaking, most persons are primarily concerned with the satisfactory cleansing action of a detergent and the resultant irritation of the skin as evidenced by itching, dryness, redness and scaling. Some of these questions can be answered more satisfactorily than the items about exact physiologic action.

A. Action of Water on the Skin.—The action of water on the skin varies considerably with the temperature of the water. All are familiar with the fact that the skin may become very red because of capillary dilatation, may exfoliate, blister or become necrotic and show scarring following contact with hot water. Also various changes occur as a result of cold water. Such effects, however, do not occur, except to a minor degree, when water of the correct temperature is used for cleansing purposes.

When water is in contact with the skin for some time, some hydration of the cells of the stratum corneum undoubtedly takes place. This hydration is probably at a minimum when the water has a p_H equivalent to the isoelectric point of the skin keratin. When the p_H of the water is either higher or lower than the isoelectric point, the hydration of the cells increases. This hydration may play some role in producing an irritation of the skin by the detergents which are used in conjunction with the water.

A patient will complain occasionally that water is "bad" for his skin. Others will state definitely that their skins itch, perhaps severely, after a bath, even when only water is used. Many complain that the hard water in a particular community "dries" the skin. No conclusive evidence has been found in the literature, however, that water by itself, either hard or soft, has any harmful effect on the skin. The calcium and magnesium salts in hard water are not present in high enough concentrations and do not impart a sufficient alkalinity to the water to injure the skin.

42. Schmidt, P. W., and Straub, R.: Ueber die Reinigungskraft neuer, sogenannter hautschonender Waschmittel (Praecutan, Satina), München. med. Wchnschr. 87: 1147-1150, 1940.

43. van Antwerpen, F. J.: Detergent Properties of Ether Sulfonates, Indust. & Engin. Chem. 31: 64-66, 1939.

44. Guild, B. T.: Personal communication to the authors.

45. French, E. D.: Experiences with Hydrophil Bases and Sulfonated Products, South. M. J. 54: 284-287, 1941.

46. Baker, Z.; Harrison, R. W., and Miller, B. F.: Action of Synthetic Detergents on the Metabolism of Bacteria, J. Exper. Med. 73: 249-271, 1941.

Of course, hard water is usually used in conjunction with soap, under which conditions insoluble calcium and magnesium soaps are precipitated onto the surface of the skin. Such a precipitate makes one's skin feel "dry." According to Jones and Lorenz,⁴⁷ these soaps form a film on the cutaneous surface, under which bacteria may multiply. Parkhurst⁴⁸ has reported negative results to regular patch tests to the precipitates which result from the reactions between soaps and hard waters. Nevertheless we feel that a precipitation of these soaps onto the surface of the skin may prolong the time the cutaneous surface remains alkaline subsequent to washing and may place fatty acids in immediate contact with the skin. Both of these factors, as will be seen later, are important in a consideration of the action of soap on the skin.

B. Action of Oils and Oil Solvents on the Skin.—Seldom is there found any harmful effect on the skin by liquid petrolatum or olive oil when either is used as a cleansing agent. Numerous persons have cleansed their skins with these oils for years with no evidence of irritation. To the contrary, small amounts of these oils left on the skin after cleansing probably serve as emollients. On the skin of persons using oil for cleansing purposes are found not infrequently scattered small pustules, and the oil folliculitis occurring in machinists and other workers in oil is well known. Occasionally a case of dermatitis due to a simple hydrocarbon, such as the case discussed by Hollander,⁴⁹ has been reported. It is conceivable that, if a vegetable or animal oil was used which had become rancid and had undergone some hydrolysis, the resulting fatty acids might be irritating to the skin. The exact cause of an irritation resulting from the use of an oily cosmetic is difficult to determine. It is not likely that it results from an irritation by, or an allergic hypersensitivity to, any hydrocarbon or glyceride of higher fatty acids in the cosmetic, since such materials are seldom irritating or allergenic.

Oil solvents undoubtedly remove some of the natural oils from the skin. Therefore they have a drying effect and thus irritate the skin. Irritations from the use of gasoline by mechanics and turpentine by painters, which are often more severe than simple dryness, are not infrequent.

C. Action of Soap on the Skin.—In spite of the fact that soap has been known since about 1500 B. C. and that as long ago as 1700, in a discussion of diseases of laundresses, Ramazzini⁵⁰ said "the sharpness of lye exposes them to 'chops' on their hands, which are sometimes so deep and troublesome as to be followed with an inflammation and fever," relatively little information is available to explain any possible action of soap on the skin.

1. Removal of Natural Oils: Frequent reference has been made to the ability of soap to act as an emulsifying agent and thereby remove the fatty substances from the cutaneous surface. If soap is used in excess, the skin is left "dry." For a skin basically deficient in the natural oils, this "drying action" may be the major effect of the use of soap. This is especially true of young children and elderly people. On the other hand, this "drying action" may be only the first step in the

more complex action of soap on the skin. Welwart⁵¹ and Schwarz⁵² have emphasized this factor.

One of the purposes of "superfating" was to prepare a soap which would be less "drying." Siebert¹⁸ states that a small amount of the excess fat in a superfatted soap may be left on the skin after rinsing. If the total amount of excess fat in a soap is less than 5 per cent, as is usually the case, and if the skin is as well rinsed as it should be in order to remove as much soap as possible, surely little of the fat will remain on the skin. The object of cleansing is exactly opposite to the object of "lubricating" the skin and it does not seem that the two processes can be successfully carried out in the same operation. Therefore, since superfatted soaps are probably almost as "drying" as ordinary soaps and since, as was previously pointed out, superfating reduces neither the excess nor the hydrolytic alkalinity of a soap, superfatted soaps may be expected to have the same action on the skin as do soaps which are made from the same oils but are not superfatted, and we agree with Klauder, Gross and Brown³⁴ when they state that "superfatted soap has been unduly emphasized as a toilet soap."

2. Alkali and Fatty Acid Irritation: The composition of soaps and their hydrolysis into alkali and fatty acids have been reviewed. Many writers, among whom are Gardiner,⁵³ Veyrières,⁵⁴ Mayer,⁵⁵ Ephraim,⁵⁶ Schwarz,⁵² Hansen⁵⁷ and Reffy,⁵⁸ believe that the alkalinity of soap is primarily responsible for its irritating action. Some believe that the alkalinity of soap is great enough to bring about keratolysis. This seems unlikely, however, since keratin in general reacts slowly, if at all, to such a weak alkali. Pillsbury and Shaffer⁴ found no marked reactions to patch tests with buffer solution until a p_H of 12.79 was reached.

The greater irritation produced by laundry soaps as compared to toilet soaps has been attributed to the higher alkalinity of the laundry soaps. Such a statement requires clarification. Solutions of most laundry soaps today have a p_H only slightly higher than solutions of toilet soaps. They do, however, contain greater amounts of alkaline builders than do toilet soaps, and these act as an "alkali reserve" to help maintain the alkalization of the cutaneous surface which is produced by soap. Also, and of greater significance perhaps, is the fact that almost invariably laundry soaps are used for much longer periods of time than are toilet soaps. It is likely that a person who shows irritation to the use of laundry soaps would also be irritated by toilet soaps should they be used for as long times as the laundry soaps are used.

Soaps of organic bases such as triethanolamine have come into use recently, particularly in cosmetics. They have been used occasionally as detergents, with the suggestion that they are less irritating because they are less alkaline. Goodman⁵⁹ stated that triethanolamine itself is not irritating to the skin. It is almost always

47. Jones, K. K. and Lorenz, M.: Relation of Calcium Soaps to Staphylococcal Infections in the Skin. *J. Invest. Dermat.* 4: 69-80, 1941.

48. Parkhurst, H. J.: Toilet Soaps, Soap Substitutes and Hard Water. A Study of Various Combinations by Patch Tests. *Arch. Dermat. & Syph.* 43: 299-310 (Feb.) 1941.

49. Hollander, Lester: Dermatitis Produced by Petrolatum: Report of a Case. *Arch. Dermat. & Syph.* 38: 49-51 (July) 1938.

50. Ramazzini, Bernardino: Diseases of Tradesmen. Compiled by Herman Goodman, New York, Medical Lay Press, 1933, p. 48.

51. Welwart: Seife und Haut, Seifensieder Ztg. 62: 667-669, 1935.

52. Schwarz, H.: Schädigungen der Haut durch Alkalien, Seifensieder Ztg. 62: 1032, 1935.

53. Gardiner, F.: Soaps and Their Effects on the Skin: An Analytical Research, Edinburgh. *M. J.* 8: 514-520, 1912.

54. Veyrières, F.: Hygiène de la peau. L'eau et la toilette, *Rev. franç. dermat. et de vénér.* 7: 102-105, 1931.

55. Mayer, R. L.: Toxidermiden, in Jadasohn, Josef: *Handbuch der Haut- und Geschlechtskrankheiten*, Berlin, Julius Springer, 1933, vol. 4, pt. 2, pp. 188-190.

56. Ephraim, J. W.: The Truth About Soap, *Am. Mercury* 32: 109-113, 1934.

57. Hansen, P.: Einige Untersuchungen über die Einwirkung der Seife auf die Haut, *Acta dermat.-venerol.* 17: 589-596, 1936.

58. Reffy, F.: Function of Soaps in Dermatology, *Budapesti orvosi ujsag* 25: 173-177, 1937.

59. Goodman, Herman: Cosmetic Dermatology: I. Triethanolamine, *Arch. Dermat. & Syph.* 36: 116-118 (July) 1937.

used, however, in conjunction with some fatty acid which would result in the formation of a soap. Klauder, Gross and Brown¹⁴ feel that, since triethanolamine soaps are still alkaline, they may be as irritating as ordinary soaps. Ray and Blank⁶⁰ found a high percentage of positive patch tests to some of the triethanolamine soaps. Apparently the lower alkalinity of the triethanolamine soaps does not make them less irritating than the soaps of inorganic bases.

Stauffer⁶¹ and Jordon, Walker and Osborne⁶² are opponents of the alkali theory of soap irritations, stating that patch tests did not indicate that the most alkaline soaps were the most irritating. Gardiner,⁶³ Goldman⁶⁴ and many other investigators state that soaps made from certain oils, particularly coconut, are more irritating than soaps made from other oils. This statement led to investigations of variations in the irritating action of different individual fatty acids by Blank,⁶⁴ who showed that the low molecular weight saturated fatty acids are more irritating than the high molecular weight saturated fatty acids. Subsequently, Emery and Edwards⁶⁵ showed that the sodium soap of lauric acid (twelve carbon atoms) is far more irritating than the sodium soaps of any of the saturated fatty acids, from eight to eighteen carbon atoms. Both investigations conclude that the high molecular weight acids, palmitic and stearic, are relatively nonirritating. Emery and Edwards⁶⁵ and also Mayer⁶⁶ state that the soaps of the unsaturated acids are more irritating than the soaps of corresponding saturated acids.

Blank⁶⁴ further showed by a special patch test technic not only that the low molecular weight fatty acids are more irritating than the high molecular weight acids but that many of the acids commonly present in soap become more irritating in the presence of small amounts of alkali. From these data it was concluded that neither the alkali alone nor the fatty acid alone is the causative agent in soap irritations but that each has some part to play.

3. Patch Tests: Patch tests were originally developed to aid in finding the causative agent for an allergic contact dermatitis. As a result of the early investigations in this field (reviewed by Bloch⁶⁶), it was concluded that before a substance is to be considered a possible cause of an allergic contact dermatitis a patch test to that substance must show a reaction "in the form of an eczema, that is, besides redness and swelling, papules and vesicles must occur." This is frequently forgotten by present day workers, and substances which show only erythematous reactions are thought to be responsible for a dermatitis. This has been particularly true of soaps. Seldom are vesicular reactions seen to soap patch tests even if a very strong solution of soap or the soap itself is used for testing. Strong soap solutions and pieces of soap produce erythematous reactions on a large percentage of all individuals; occasional papular reactions are seen. Dilute solutions (1:50 to 1:500) produce erythematous reactions on some indi-

viduals. It is our opinion however that, when persons with normal skins (controls) are tested along with those who show suspected dermatitides from soap, no correlation can be found between erythematous reactions to soap patch tests and the presence of the dermatitis.

Most of the dermatitides from the use of soap occur in those individuals who find it necessary to be in contact with soap solutions for long periods of time (laundresses, dish washers, housewives). Under these conditions the cutaneous surface is kept alkalinized. Regular patch tests with dilute solutions, and possibly with more concentrated solutions, do not keep the cutaneous surface in this same alkalinized state, since the skin has the capacity to neutralize externally applied alkali, as has been shown by Burckhardt⁶⁷ for alkali and by Hansen⁶⁷ for soaps. Patch tests should duplicate actual clinical contact with the material in question, as nearly as possible, before the results of these patch tests are used to establish the cause of the dermatitis, especially when the patch test reactions are not vesicular. Regular patch tests with soaps do not duplicate clinical contact with soaps with respect to the degree and duration of the alkalization, the temperature of the skin or the amount of water present. No standard patch test for soaps has been established which definitely states the concentration of the solution or amount of solution to be used, the size of the test site, the position of the test site or the duration of the test, except possibly the type of test suggested by Emery and Edwards.⁶⁵ The degree of alkalization per unit area is not controlled; the time of alkalization cannot be controlled, since the neutralization of the alkali by the skin is variable. Thus the regular patch test must be considered of questionable value in diagnosing a dermatitis which follows the use of soap. Some modifications of the regular patch test have been suggested by various workers, but it is our opinion that none of the modifications are entirely satisfactory as a diagnostic indication in such a dermatitis.

4. Pathogenesis of a Dermatitis Due to the Use of Soap: In using the word "irritation" throughout this discussion, it was not intended to rule out the possibility of soap reactions having an allergic basis. As a matter of fact, in one of the references quoted⁶⁸ the authors state that soap irritations are allergic reactions. In a recent paper⁶⁸ these same workers again stress the allergic nature of soap reactions, though at times they use the terms "allergic" and "hypersensitive" interchangeably and do not prove that soap reactions are specific hypersensitivities, a prerequisite before they can be called allergic. Goodman and Sulzberger⁶⁹ and Klauder, Gross and Brown¹⁴ on the other hand, state that they believe that true allergic hypersensitivity to soaps is comparatively infrequent. These differences in opinion seem to arise from the lack of accurate definitions and the present lack of absolute knowledge of the mechanisms of allergic reactions and of primary irritations.

Sulzberger⁷⁰ has recently compiled the following definitions: "Sensitive shall mean being capable of manifesting a reaction upon adequate exposure. Hyper-

60. Ray, L. F., and Blank, I. H.: Effect of Ointment Bases on the Skin: I. Results of Patch Tests with Commonly Used Ointment Bases, *Arch. Dermat. & Syph.* 42: 285-289 (Aug.) 1940.

61. Stauffer, H.: Die Ekzempfen (Methodik und Ergebnisse), *Arch. f. Dermat. u. Syph.* 162: 517-576, 1931.

62. Jordon, J. W., Walker, H. L., and Osborne, E. D.: Studies in the Eczematizing Properties of Soaps, *New York State J. Med.* 36: 791-795 (May 15) 1936.

63. Goldman, L.: Patch Tests with Soaps, *M. Bull. Univ. Cincinnati* 7: 90-92, 1935.

64. Blank, I. H.: Action of Soap on Skin, *Arch. Dermat. & Syph.* 29: 811-824 (May) 1939.

65. Emery, B. E., and Edwards, L. D.: The Pharmacology of Soaps: II. The Irritant Action of Soaps on Human Skin, *J. Am. Pharm. A.* 29: 251-254, 1940.

66. Bloch, Bruno: The Role of Idiosyncrasy and Allergy in Dermatology, *Arch. Dermat. & Syph.* 19: 175-197 (Feb.) 1929.

67. Burckhardt, W.: Beiträge zur Ekzempfrage: Die Rolle des Alkali in der Pathogenese des Ekzems speziell des Gewerlekekrzems, *Arch. f. Dermat. u. Syph.* 172: 155-167, 1935.

68. Jordon, J. W., Dolce, F. A., and Osborne, E. D.: Dermatitis of the Hands of Housewives: Role of Soaps in Its Etiology and Mechanism for Its Prevention, *J. A. M. A.* 115: 1001-1006 (Sept. 21) 1940.

69. Goodman, J., and Sulzberger, M. B.: Allergy in Dermatology: A Critical Review of Recent Contributions, *J. Allergy* 11: 407-426, 1941.

70. Sulzberger, M. B.: *Dermatologic Allergy*, Springfield, Ill., C. C. Thomas, Publisher, 1940.

sensitive shall designate more sensitive to a certain exposure than is usual, that is, than is the norm as determined by an adequate control group. Allergically hypersensitive will therefore describe the condition of those who have specifically acquired a state of sensitivity greater than the norm or control group." Are dermatitides resulting from contact with soap sensitivities, hypersensitivities or allergic hypersensitivities?

Such a dermatitis does result from an adequate exposure to soaps and is therefore a sensitivity, but the necessity of stating what is an "adequate exposure" at once becomes apparent. It is probable that, with long enough exposure to a concentrated enough soap solution, every one would show some reaction, just as almost all normal skins show mild reactions to forty-eight hour patch tests to pieces of soap. This fact, by itself, has led some investigators to conclude that soap dermatoses are primary irritations. If, on the other hand, patch tests are made with dilute solutions of soap (1 to 2 per cent) relatively few people show reactions. These patch tests might be compared to a clinical exposure to a small amount of soap, under which conditions most normal skins show no reactions. Therefore, dermatitides from soap, which occur with the use of only a normal amount of soap, are hypersensitivities, i. e. reactions which indicate a greater sensitivity to a certain exposure to soap than the average individual shows. Many physicians may also agree that soap dermatitides even in individuals who use excessive amounts of soap are hypersensitivities. Among the so-called normals there may be some persons whose skins would show soap irritations should their total exposure to soap be increased. But in the group which has excessive exposure to soap (housewives, domestics, dishwashers, laundresses, for example) relatively few manifest dermatitides of sufficient intensity to cause them to consult a physician, and about the same proportion of people might be expected to show a dermatitis from excessive use of soap, should every one be exposed to these large amounts of soap. Even in patients who develop a dermatitis from the use of relatively small amounts of soap, it is our impression that an exposure to a greater amount of the noxious agent (soap in this case) is necessary in order to produce the dermatitis than is required in the case of an allergic hypersensitivity to a commonly accepted allergen such as paraphenylenediamine.

These soap hypersensitivities are certainly acquired. Most dermatitides from the use of soap do not start until after adolescence. Goldman⁷¹ has shown that newborn infants do not show positive reactions to patch tests with soaps. The histories obtained from almost all patients who seem to show a dermatitis from contact with soap indicate that this dermatitis developed after relatively long contact with soap in general and, even when the history points to a single soap as the causative agent, the dermatitis usually appears only after the soap has been used several times.

So far the requirements for allergic hypersensitivity have been fulfilled. But are these reactions specific hypersensitivities? The adherents of the allergy theory of dermatitides from soap have not proved that they are; the opponents of the theory feel that they have proved that they are not by showing that these patients react to any alkali. The latter statement, we believe, requires some confirmation. But, even if these patients

do react to any alkali, one should still inquire if they are hypersensitive to alkalis; i. e., do they react more strongly to equal concentrations of alkali than normals, do they react to the same degree to weaker concentrations of alkali or do they react to the same concentration of alkali when exposed for a shorter period of time? If they are hypersensitive to alkali, could such a reaction be called a specific reaction to the hydroxyl radical, which, of course, is common to all alkalis?

Regarding the specificity of allergic reactions, Sulzberger⁷⁰ makes the following statements: Allergy is "any acquired specific alteration in the capacity to react, which occurs in living organisms or tissues upon exposure to certain living or inanimate agents or substances. The 'specific' refers to the fact that the alteration which is produced by a certain agent can be made manifest on reexposure to only that same agent or to an immunologically related agent." Allergists, in general, agree, as is implied in the foregoing statements, that allergic reactions are immune reactions of some type, even though in many cases the antigen-antibody system has not been demonstrated. The hydroxyl radical can hardly be thought of as an antigen according to our present concepts. Nor is it possible that any patient will manifest an immunologic reaction to the hydroxyl radical per se, because, if so, reactions would occur merely from the result of contact with the body fluids. It is within the realm of possibility, however, that at high concentrations the hydroxyl radical might conjugate with or alter certain tissue substances, resulting in the formation of new substances which might be antigenic. Landsteiner and Jacobs⁷² have suggested that such conjugated antigens may be formed from relatively simple chemical compounds, and the later work of Sulzberger and Baer⁷³ tends to support this hypothesis. Thus, if it could be shown that the hydroxyl radical serves to initiate an immunologic reaction in the hypersensitive individual, the opponents of the allergic theory of dermatitides from soap could no longer oppose this theory on the basis that the soap "sensitive" individual reacts to alkalis. This has not yet been proved however and, until such a time as dermatitides from the use of soap can be shown to be specific, acquired hypersensitivities they cannot be called "allergic."

The one exception to these statements is the individual who can be shown to be specifically hypersensitive to a fatty acid or to a perfume, dye, antiseptic or some other added ingredient in soap. Such cases have been discussed by Lublinski,⁷⁴ Mayer⁵⁵ and Cady.⁷⁵

Still another possibility exists. Some of the fatty acids are constituents of both the sebum and the sweat. Fatty acids, in the presence of alkali, have been shown to be irritating to some skins.⁶⁴ It is possible that a person who is thought to be hypersensitive to alkali alone is not showing this hypersensitivity to the alkali itself but to the fatty acids naturally occurring on the skin in the presence of the added alkali.

Many investigators have studied the penetration of the skin by various substances. No reference has come to our attention, however, which is concerned specifically

72. Landsteiner, K., and Jacobs, L.: Studies on Sensitization of Animals with Simple Chemical Compounds, *J. Exper. Med.* **61**: 643-656, 1935.

73. Sulzberger, M. B., and Baer, R. L.: Sensitization to Simple Chemicals: III. Relationship Between Chemical Structure and Properties, and Sensitizing Capacities in the Production of Eczematous Sensitivity in Man, *J. Invest. Dermat.* **1**: 45-58, 1938.

74. Lublinski, E.: Ueber die Hautentzündende Wirkung mancher Toiletseifen und deren Ursache, *Seifensieder Ztg.* **50**: 4-5, 1923.

75. Cady, L. D.: What's Behind the Label? *Hygeia* **13**: 795-797, 1935.

71. Goldman, Leon: Skin Reactions of Infants and Children to Soaps, *J. A. M. A.* **108**: 1317-1320 (April 17) 1937.

with the penetration of soap solutions into the skin. It seems possible that variations in the irritability of different skins to soap solutions may be dependent on the ease of penetration of at least the stratum corneum of the skin. Perhaps the less alkaline triethanolamine soaps penetrate more easily than the more alkaline soaps of inorganic bases and are therefore more irritating. Investigations along these lines should prove fruitful.

The removal of the natural fats from the skin may play some part in producing dermatitides from the use of soap. Both the alkalinity and the nature of the fatty acid fraction of the soap are important factors. The alkalinity is never great enough to warrant saying that these dermatitides result solely from a direct chemical reaction between the alkali and the keratin. The penetration of soap or some of its constituents into or through the skin may play a role in producing soap reactions. Some alteration in the skin physiology may be necessary before the use of soap can produce a dermatitis. Dermatitides from soap may have an allergic basis; but they cannot be classified as allergic at the present time, since they have not yet been shown to be specific, acquired hypersensitivities. The pathogenesis of a dermatitis from the use of soap is not yet clearly understood.

D. Action of the New Detergents on the Skin.—The new detergents are satisfactory skin cleansers but they have been used as skin detergents for such a short period of time that little is known about their action on the skin. Carpenter⁷⁶ and Biederman⁷⁷ reported isolated cases of irritations to the alcohol sulfates. Goldman⁶³ found 28 per cent positive patch tests to "sodium lorol sulfate." Emery and Edwards⁷⁸ showed by patch tests that the sodium alkyl sulfates are less irritating to the skin than the sodium salts of the saturated fatty acids from eight to eighteen carbon atoms.

Osborne and Putnam⁷⁹ and Schwartz⁸⁰ have reported irritations due to sulfonated oils of unknown compositions used on textiles. Blank⁶⁴ recommended the use of a mixture of sulfonated vegetable oils, liquid petrolatum and water as a detergent for contact and atopic dermatoses, reporting a very low percentage of irritations due to this detergent among 150 cases. A further clinical investigation of this same material was made in ten different dermatologic clinics, the results of which have been reported by Lane and Blank.⁸¹ This sulfonated oil was used by patients with various diseases of the skin. The results of this investigation indicated that over 92 per cent of these patients could use this material as a detergent without aggravating their cutaneous conditions. Lane and Blank⁸² have recently reported on the satisfactory use of this sulfonated oil material as the only detergent used over the period of one year in a nineteen bed dermatologic ward. Klauder, Gross and Brown¹⁴ have found several different sulfonated oils to be satisfactory skin cleaners.

76. Carpenter, C. C.: *Dermatitis Produced by Hymolal Salts*, Arch. Dermat. & Syph. 30: 517 (Oct.) 1934.

77. Biederman, J. B.: *Sensitivity to Drene Shampoo*, New England J. Med. 217: 1088-1089 (Dec. 30) 1937.

78. Emery, B. E., and Edwards, L. D.: *The Pharmacology of Soaps III. The Irritant Action of Sodium Alkyl Sulfates on Human Skin*, J. Am. Pharm. A. 29: 254-255, 1940.

79. Osborne, E. D., and Putnam, E. D.: *Industrial Dermatoses, with Special Reference to Allergy and Mycotic Dermatitides*, J. A. M. A. 90: 972-977 (Sept. 17) 1922.

80. Schwartz, L.: *Actual Causes of Dermatitis Attributed to Soaps*, Pub. Health Rep. 49: 1176-1185, 1934.

81. Lane, C. G., and Blank, I. H.: *Sulfonated Oil as a Detergent for Diseases of the Skin*, Arch. Dermat. & Syph. 43: 435-443 (March) 1941.

82. Lane, C. G., and Blank, I. H.: *Sulfonated Oil as a Detergent Its Use in a Dermatologic Ward*, Arch. Dermat. & Syph. 44: 999-1008 (Dec.) 1941.

Jordan, Dolce and Osborne⁶⁸ have reported the satisfactory use of a detergent containing lauryl sulfoacetate for "27 patients who were allergic to soap." One of these was also allergic to lauryl sulfoacetate.

Among the various types of detergents used for cleansing the skin, water and the commonly used liquid petrolatum and olive oil seldom, if ever, irritate the skin. Some oil solvents and soap may irritate the skin of certain individuals. Among the new detergents, sulfonated oils and the sulfated alcohols have been the most extensively used as skin detergents up to the present time. These materials are still too new to allow a final evaluation of their effects on the skin, but it appears that many persons whose skins are irritated by the use of soap will be able to use one or more of these new materials without ill effect.

VI. COMMENT

It is readily apparent, from this review, that many points concerning the mechanism of the removal of soil from the surface of the skin by detergents and the action of these detergents on the skin itself are still controversial, but an attempt has been made to indicate the most satisfactory explanations, in our opinion, at the present time. Some of these points seem to us to deserve further emphasis.

Although water is used for removing the soil from the skin a major part of the time, the soil to be removed is mostly insoluble or oil soluble but not water soluble. The insoluble soil probably seldom gets into actual contact with the epidermal cells of the normal skin because of the more or less continuous film of oily sabaceous material on the surface of the skin. Of the detergents added to water to remove this soil, soap is the most commonly used. Cleansing with soap and water probably removes the insoluble soil by emulsification, not saponification, of the oily film which separates the insoluble soil from the skin proper.

Micro-organisms may be thought of as a type of insoluble soil and mechanical removal of these organisms, by the action just described, plays a greater role in skin "sterilization" by scrubbing than does the actual bactericidal action of the detergent which is used.

It has been stated that the skins of some people are irritated as a result of contact with detergents. At times this may be only a "dryness" resulting from the removal of the oil-soluble, endogenous soil which has served as a "lubricant." If a more severe irritation occurs and the detergent employed has been soap, the types of fatty acids in the soap and the degree and duration of the alkalization of the cutaneous surface caused by its use are factors which play some part in producing this irritation. The low molecular weight, saturated fatty acids, present in large amounts in coconut and palm kernel oils, are more irritating than the high molecular weight acids. Each of the fatty acids commonly found in soaps becomes more irritating in the presence of alkali. A factor which should be important in determining whether or not an individual will be irritated by a detergent is the ease with which that detergent will penetrate at least the stratum corneum of the skin. This factor has as yet received but little attention in the study of irritations due to detergents.

The sodium salts of the saturated fatty acids, which have a molecular weight equivalent to or less than myristic acid, are relatively irritating. These salts may constitute as much as one fourth of the actual soap in an average American made toilet soap.

Laundry soaps are usually considered to be more irritating than toilet soaps. There are two apparent reasons for this. The laundry soaps contain larger amounts of builders with the result that the total available alkali is greater, though the actual p_H may be little or no higher than the p_H of toilet soaps. Of more importance, however, is the fact that laundry soaps are invariably used for longer periods of time with a resulting alkalization of the cutaneous surface for a long time. It is probable that many people who show an irritation of the skin from the use of laundry soap would likewise be irritated by toilet soap should they use it for as long a time as they use laundry soap.

Superfating of soaps does not reduce the alkalinity of soaps and little, if any, of the superfating material is left on the skin after washing. It is difficult to perform satisfactorily both the cleansing and the lubrication of the skin in the same operation.

Although triethanolamine soaps are less alkaline than similar soaps of inorganic alkalis, regular patch tests have not indicated that they are less irritating to the skin. The penetration factor that has been mentioned may be important in this reaction.

The technic of making patch tests with soap has varied greatly. No standard technic has been agreed on, and it may be difficult to work out a technic which will satisfy all investigators and provide for the proper interpretation when all factors are considered. The concentration of the solution used and the amount applied have varied. Neither the patch test site nor its area has been constant. The duration of the test has varied. Thus the degree of alkalization per unit area is not controlled. Nor is the time of alkalization controlled, since the skin has the ability to neutralize externally applied alkali and the rate of this neutralization is not a constant factor.

Soap patch tests seldom show vesicular reactions. When reactions to patch tests which are not vesicular are being interpreted, it is important that the patch test technic duplicate as closely as possible the actual clinical contact with the material in question. Regular soap patch tests do not duplicate clinical contact with soap and must therefore be considered of questionable value in diagnosing dermatitides which are thought to result from the use of soap.

Since vesicular reactions to soap patch tests are seldom seen, the suspicion at once arises that dermatitides from soap are not allergic contact dermatitides. Since, however, a relatively few people have a dermatitis from soap, and since those who do have acquired it after previous contact with soap, these dermatitides can be called acquired hypersensitivities. They fail to meet the requirements of an allergic contact dermatitis only in that they have not yet been shown to be specific for any one substance.

The actual pathogenesis of a dermatitis from soap is not yet known. Though both the alkali and the fatty acid fraction play some role in producing a dermatitis, the mechanism is probably not that of a simple chemical reaction between either substance and the skin. Penetration of at least the stratum corneum may be important, as may also some alteration in the physiology of the skin, though nothing specific is yet known of either of these factors. The final classification of a dermatitis from soap must await a better understanding of its pathogenesis.

In many dermatoses which are not initially caused by the use of soap, its continued use may nevertheless aggravate or prolong the duration of the disease. A further complicating factor is the irritation which at times is produced by certain types of therapy. Frequently when a patient with a dermatitis presents himself to the physician it is difficult to decide the relative importance of the initial disease and the part played in producing the dermatitis by the previous therapy and by the removal of ointments by various detergent methods. An atopic dermatitis, for instance, may be complicated by the use of an ointment containing tar and by the excessive amount of soap and water used to remove the ointment stains.

Cleansing agents, such as strongly alkaline soaps, oils and oil solvents, are an important factor in the causation of occupational dermatitis. About one third of all dermatitis caused by work occurs in those occupations in which the workman's skin is in frequent contact with soap or other alkaline materials,⁸³ and, in addition, many housewives are not included in any compilation of cases. Studies have been made by various single industries to determine the part played by soap in causing the occupational dermatoses of that industry. In some industries, even though it may not be necessary for the workmen to come in contact with soap or other detergents frequently, nevertheless the dermatitis may be caused, or at least accentuated, by the detergent rather than by any substance used by the workman while carrying out his duties. The Committee on Healthful Working Conditions,⁸⁴ Schwartz and Tulipan⁸⁵ and Klauder, Gross and Brown¹⁴ have recently discussed the cleansing process in relation to industrial dermatitis and have recommended methods for preventing such dermatitis from occurring as a result of improper cleansing technics. More and more attempts are being made by industrial management to establish cleansing methods which will not irritate the skin of the workmen.

Many new wetting agents are finding use as detergents for cleansing the skin. Some of these materials, which were formerly considered cutaneous irritants, have now been shown to be nonirritating when properly made and have been satisfactorily substituted for soap under conditions in which soap has been found to be irritating.

In spite of the large amount of material existing on the subject of detergents, there remain numerous fundamental problems to be solved. Further elucidation of the process of cornification of the skin would be valuable, as well as a study of the factors affecting penetration of detergents and other substances into the various layers of the skin. The exact action of detergents in the removal of soil and on the skin itself calls for further investigation. The pathogenesis of a dermatitis from the use of detergents especially, and the development of a reliable standard patch test or other tests to aid in the proper interpretation of the causal factors of such a dermatitis, are subjects for consideration by laboratory and clinical workers. With further research on some of these fundamental subjects there would undoubtedly be developed more effective and safer detergents and perhaps a more effective method of skin sterilization without injury to the skin.

416 Marlboro Street.

83. Lane, C. G.: *Skin Diseases with Particular Reference to Their Industrial Application*, J. Indust. Hyg. 7: 444-450, 1925.

84. Committee for Healthful Working Conditions, National Association of Manufacturers: *Industrial Dermatitis*, Indust. Med. 9: 319-322, 1940.

85. Schwartz, Louis, and Tulipan, Louis: *Occupational Diseases of the Skin*, Philadelphia, Lea & Febiger, 1939, p. 37.

Council on Industrial Health

MEDICAL SERVICE IN INDUSTRY

THE COUNCIL ON INDUSTRIAL HEALTH HAS APPROVED THIS ARTICLE AS THE FOURTH IN A SERIES ON MEDICAL SERVICE IN INDUSTRY.

C. M. PETERSON, M.D., Secretary.

PLANT HYGIENE STUDIES

The location, identification and control of unhealthful occupational exposures is a primary function of the industrial physician. Technically, an exposure is defined as any working condition or environment, process, operation or material used in manufacturing which is capable of causing harmful physical effects. These may, on occasion, be so obvious that workers themselves are perfectly familiar with their source. Most frequently periodic physical examination of employees will prove to be the most sensitive index of the effect on workmen of industrial exposure and inadequacy of control measures. Elsewhere, discovery requires diligent combined effort by highly trained medical and engineering personnel. In any case, systematic methods are essential in order that dependable data may be secured on which a program of adequate control can be based. Plant hygiene studies have proved to be reliable and to require least expenditure in time and money. The procedure is essentially one of taking periodic inventory of unsatisfactory occupational risk.

LOCATION OF EXPOSURES

Experience in large and small industrial establishments suggests that plant hygiene studies are likely to be most successful if certain steps are followed:

1. A complete list of all materials used in manufacture should be secured. Those capable or suspected of causing trouble should be suitably indicated on the list.

2. All steps in manufacture should be described, preferably in the form of a diagram or schematic representation, to indicate the flow of goods from raw material to finished product.

3. Thorough inspection of the working premises is essential to test conclusions drawn from the inventory of materials and processes and to evaluate other conditions of work which are potential contributors to disability and lowered production. It must not be forgotten that harmless substances may under certain conditions or in susceptible individuals become harmful. In the same way, no matter how much care has been expended in preliminary investigation, additional or unsuspected sources of exposure will be missed unless every aspect of the working environment is carefully scrutinized.

4. A record should be made of every material, process or environment capable or suspected of causing injury or disease, the exact location of each, and the number of workers exposed.

IDENTIFICATION OF EXPOSURES

Exposures are important by nature, extent and the degree to which they may be controlled. Most industrial hygienists believe that sufficient information exists about control methods in general to permit safe handling of all but very new or recently introduced substances in industry.

Problems of this nature likely to be encountered by the physician in industry are extremely diverse and widespread. Efforts have been made to classify them. One of the most useful outlines is the following, taken from Bulletin 41 of the U. S. Department of Labor, "Occupation Hazards and Diagnostic Signs," by Louis I. Dublin and Robert J. Vane, 1941.

- A. Abnormalities of air pressure.
- B. Abnormalities of temperature and humidity.
- C. Dampness.
- D. Defective illumination.
- E. Dust.
- F. Infections.
- G. Radiant energy.
- H. Repeated motion, pressure, shock.
- J. Poisons.

Subheadings under the major title of poisons are most numerous, and a complete list of all substances capable of causing local or systemic effects is a very considerable one. In the case of allergic manifestations arising from industrial substances, the list of potential exposures becomes almost endless.

ENGINEERING STUDIES

Following location and identification, the physician should indicate in the record his estimate of the seriousness of each exposure. If doubt exists about its exact nature or satisfactory control, assistance is needed from an industrial hygiene engineer. In fact, confirmation about the severity of most exposures is often highly desirable and it is routine practice in many manufacturing concerns for an engineer with suitable qualifications to verify all preliminary estimates. Qualitative and quantitative analyses of each exposure are available in this way for use as factual evidence if necessary. All determinations of this character should be suitably entered in the records.

CONTROL OF EXPOSURES

As soon as the industrial physician has established a source of occupational disability he must set the machinery in motion for adequate control. Since the physician must in many situations recommend specific control measures or pass judgment on the effective nature of proposed or existing installations, a knowledge of the fundamentals of industrial hygiene engineering is a most useful piece of equipment for him to possess. Control procedures fall in one of the following major classifications:

1. Substitution—harmless materials are substituted for those causing trouble.
2. Alterations in processing or manufacturing.
3. Segregation of operations.
4. Capture of dusts, fumes, mists, vapors or gases at the point of origin.
5. Use of personal protective equipment.

The actual application of these general principles often requires a high degree of specialized knowledge and technical skill obtainable from properly qualified engineers and industrial hygienists.

NEW PROCESSES

All new processes, materials or modifications of old ones should be investigated in much the same way and in advance of installation to prevent the introduction of unexpected exposures.

MAINTENANCE OF CONTROL

Plant medical inspections are an essential phase of control maintenance and consequently of the industrial physician's routine. These inspections should occur periodically. Sites of greatest exposures need frequent attention, possibly constantly repeated chemical and engineering evaluation. Others are visited in relation to their importance. Periodic plant walks by the medical department personnel throughout the entire establishment is particularly sound practice. Occasionally, inspections should be made in company with officers of the firm, particularly those responsible for production, personnel, plant conditions and safety. Active interest and cooperation from management is quite as great an element of successful medical department administration as cooperation from the workmen. Employees most emphatically need instruction and regular supervision in order that adequate understanding may exist about the continuous and proper use of protective devices.

The record system of the medical department should contain copies of recommendations leading to the installation of control measures, the date of installation and the dates of and special notations about follow-up visits and inspections. Forms can readily be devised which will facilitate the uniform recording of all results of plant inspection.

Medical inspection has additional advantages. It provides opportunity for thorough familiarity with every job in the plant. Information of this character is of the greatest usefulness in relating work assignments to the physical and temperamental qualifications of workmen. It is reassuring to employees

to know that plant conditions are under observation by medical personnel. It is equally satisfactory to employers to realize that proper records are available in case claims arise out of alleged unhealthful conditions of work.

APPLICATION IN SMALL PLANTS

The physician serving a small plant should be guided in his approach to unhealthful exposures by these same general principles. Frequently he will need special technical assistance. Committees on industrial health are being developed in state and county medical societies in order that the practicing physician called on to serve in industry may have access to ready sources of consultation and special information. Preliminary plant hygiene studies should in many cases be arranged through qualified consultants. Obscure exposures will require aid of this same description.

Assistance can frequently be secured by application to experienced industrial physicians or industrial hygienists. Occasionally consulting services are provided by insurance companies or trade associations to member companies. A few city and county health departments have established bureaus of industrial hygiene for investigation and consultation about occupational exposures. If local resources fail, assistance may be sought through bureaus of industrial hygiene in state health or labor departments, and these in turn have the advantage of specialized information and investigating facilities supplied by the Division of Industrial Hygiene of the United States Public Health Service.

Council on Foods and Nutrition

THE COUNCIL ON FOODS AND NUTRITION HAS AUTHORIZED PUBLICATION OF THE FOLLOWING REPORT. FRANKLIN C. BING, Secretary.

NIACIN AND NIACIN AMIDE

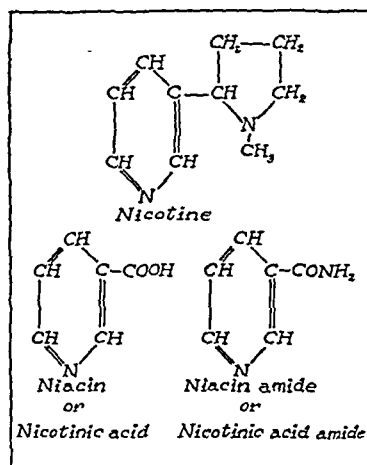
The name "nicotinic acid" was coined many years ago because this compound was first made by oxidation of nicotine in the laboratory. These two substances, so similar in name, are only remotely related to each other. Nicotinic acid, or pyridine-3-carboxylic acid, is an oxidation product or a derivative formed by the destruction of nicotine. Nicotinic acid is a vitamin that is essential in the diet; and nicotine, of course, is a well known toxic substance. No difficulties were experienced with the name "nicotinic acid," however, until after its vitamin properties were discovered in 1938. It soon became apparent that the names "nicotinic acid" and "nicotinic acid amide" were likely to cause unwarranted apprehension in the minds of the general public whenever these terms appeared in advertising or in the labeling of food products. Enriched flour and enriched bread are required to contain definite amounts of nicotinic acid or of nicotinic acid amide to be entitled to bear the designation "enriched."

Recently the Food and Nutrition Board of the National Research Council appointed a committee, consisting of Drs. C. A. Elvehjem, W. H. Sebrell and T. D. Spies, to consider the problem and to select unobjectionable synonyms for these terms if the committee considered such action to be desirable. This committee gave much thought to the problem and made a number of recommendations. The Food and Nutrition Board adopted the recommendation of the committee that "niacin" and "niacin amide" be accepted as synonyms for "nicotinic acid" and "nicotinic acid amide" respectively. Registered trade marks in the Patent Office and copyrights in the Library of Congress have been studied and no conflict has been found with these proposed names. The recommendation was also made that the terms "nicotinic acid" and "nicotinic acid amide" be used as first choice in all scientific literature and that the new terms be used only when there may be misunderstanding on the part of the general public.

Federal Security Administrator Paul V. McNutt has announced that in his opinion the synonyms will not be inconsistent with the requirements of the Federal Food, Drug and

Cosmetic Act for the purpose of declaring "nicotinic acid" and "nicotinic acid amide" on the labels of products subject to this act.

The members of the Council on Foods and Nutrition were informally polled about these terms before they were adopted by the Food and Nutrition Board. The Council now has voted



Structural formulas of niacin and related compounds.

that the terms "niacin" and "niacin amide" will be acceptable as synonyms for "nicotinic acid" and "nicotinic acid amide" respectively when used in connection with products and considerations that come within the scope of this Council. Niacin is pronounced with a long "i" and a soft "c" (nai'a-sin).

ACCEPTED FOODS

THE FOLLOWING ADDITIONAL FOODS HAVE BEEN ACCEPTED AS CONFORMING TO THE RULES OF THE COUNCIL ON FOODS OF THE AMERICAN MEDICAL ASSOCIATION FOR ADMISSION TO ACCEPTED FOODS.

FRANKLIN C. BING, Secretary.

PREPARATIONS USED IN THE FEEDING OF INFANTS (See Accepted Foods, 1939, p. 156).

Harold H. Clapp, Inc., Rochester, N. Y.

CLAPP'S JUNIOR FOODS BRAND PINEAPPLE ORANGE RICE PUDDING, a canned cooked mixture of milk, pineapple, sugar, orange juice, rice, farina, eggs and salt.

Analysis (submitted by manufacturer).—Total solids 27.1%, ash 0.5%, fat (ether extract) 1.0%, protein (N \times 6.25) 1.8%, crude fiber 0.1%, carbohydrate (by difference) 23.7%, calcium (Ca) 22.8 mg. per hundred grams, phosphorus (P) 14.1 mg. per hundred grams, iron (Fe) 7.6 mg. per hundred grams, copper (Cu) 0.04 mg. per hundred grams.

Calories.—1.1 per gram; 31.5 per ounce.

UNCLASSIFIED AND MISCELLANEOUS FOODS (See Accepted Foods, 1939, p. 351).

Hardy Salt Co., St. Louis.

HARDY'S STABILIZED IODIZED SALT.

Analysis (submitted by manufacturer).—Sodium chloride 98.5%, potassium iodide 0.010%, moisture of 0.10-0.15%, calcium sulfate 0.75%, basic magnesium carbonate 0.50%, sodium thiosulfate 0.012%, calcium chloride 0.05%, magnesium chloride 0.02%.

VEGETABLES AND MUSHROOMS (See Accepted Foods, 1939, p. 340).

General Foods Corporation, Chicago.

BIRDS EYE BRAND FROZEN BROCCOLI.

Analysis (representing typical analysis submitted by manufacturer).—Moisture 90.02%, reducing sugar before inversion (as invert) 1.00%, reducing sugar after inversion (as invert) 1.52%, sucrose (calculated) 0.49%, starch 0.33%, crude fiber 1.02%, protein (N \times 6.25) 3.44%, ether extract 0.33%, ash 0.81%, undetermined 2.56%.

Vitamins.—The average vitamin content of this product according to chemical analyses furnished by the firm is: vitamin A 4,700 international units per hundred grams, thiamine 0.088 mg. per hundred grams, riboflavin 0.096 mg. per hundred grams, ascorbic acid 78 mg. per hundred grams.

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SATURDAY, MARCH 7, 1942

THE ATLANTIC CITY SESSION

The American Medical Association is scheduled to hold its annual session for 1942 in Atlantic City in the week June 8-12. Plans have been going forward steadily for this important meeting. Long before the United States entered the war, the House of Delegates and the Board of Trustees had agreed to endeavor to make this session an inter-American meeting, as an indication of the close relationship in medicine prevailing among all the American nations. The Council on Scientific Assembly and the secretaries of the various sections have been enlisting the attendance of physicians from the other American nations, including also contributions to the program and to the Scientific Exhibit.

Already there are indications that many of the South American nations are inclined to participate. The Brazilian government has offered some exhibits dealing particularly with yellow fever and malaria. Subject of course to the difficulties of transportation, there is definite promise of the attendance of some of the leading figures in medicine in South America, Canada, the West Indies, Mexico and Central America. As a part of the promotion of inter-American relations, some of the leading foundations in the United States have brought to this country young physicians who are now serving internships in American hospitals or who are undertaking graduate education or research in American medical schools and universities. No doubt many of these South American representatives will attend the annual session. Moreover, the Coordinator of Inter-American Affairs has also agreed to aid in the promotion of this project. The Department of State is arranging to extend an invitation on behalf of the American Medical Association to the official medical societies of all the South American countries. Every effort is thus being made to insure a successful conclusion to the project under the extremely difficult conditions which now prevail.

The medical profession of Atlantic City and of New Jersey are doing their utmost to insure a successful meeting; several events of special interest in relation to the war are being scheduled. Official representa-

tives of various governmental agencies concerned with the medical participation in the war have promised to be present and to contribute to the program.

A few physicians have written to the American Medical Association suggesting the abandonment of the annual session for fear that enemy naval vessels or aircraft might select Atlantic City as the special object of their ministrations during the time of the annual session. The vast majority of the medical profession of the United States and the representatives of various governmental agencies who have been consulted have felt that the meeting should by all means be held as originally planned. In this issue a list of hotels and advice concerning the making of reservations appears on page 38.

DISABILITY INSURANCE AND HOSPITALIZATION PAYMENTS

The following editorial, because it deals with a matter of importance relating to possible current legislation, has been especially authorized and approved by the Board of Trustees of the American Medical Association.

In his budget message to the second session of the Seventy-Seventh Congress, January 7, President Roosevelt recommended "an increase in the coverage of old age and survivors' insurance, addition of permanent and temporary disability payments and hospitalization payments beyond the present benefit programs, and liberalization and expansion of unemployment compensation in a uniform national system." On Jan. 20, 1942 a communication from the President was sent to the House of Representatives requesting \$300,000,000 for "extended unemployment compensation benefits." This recommendation apparently is not related to the proposed disability and hospitalization payments but refers only to problems of unemployment occasioned by the changing of industrial plants from the production of peace time goods to the production of war materials. Officially, this is the status of a recommendation thrown by the President recently into the whirlpool of public opinion. The discussion of the problem is agitating leaders in the fields of prepayment plans for medical care and hospitalization, hospital management and medical practice.

Various conferences in Washington with representatives of the Social Security Board yield the impression that the proposal of the President involves primarily a plan to increase taxation under the Social Security Act by 1 per cent, of which 0.5 per cent is to be paid by the worker and 0.5 per cent by the employer, with a view to providing every insured worker or his dependents during periods of hospitalization with the sum of \$3 a day. The plan would involve also allowances in cash to cover disability equal to the present allowance for unemployment during periods of sickness. This proposal apparently had its origin in the report of the Technical Committee on Medical Care, which introduced the so-called National Health Program in the

National Health Conference in Washington in 1938. At that time the House of Delegates of the American Medical Association held a special session to give consideration to the national health program. The Reference Committee on Consideration of the National Health Program in a report adopted by the House of Delegates said:

Your committee approves the principle of hospital service insurance which is being widely adopted throughout the country. It is susceptible of great expansion along sound lines, and your committee particularly recommends it as a community project. Experience in the operation of hospital service insurance or group hospitalization plans has demonstrated that these plans should confine themselves to provision of hospital facilities and should not include any type of medical care.

The committee also said:

In addition to insurance for hospitalization your committee believes it is practicable to develop cash indemnity insurance plans to cover, in whole or in part, the costs of emergency or prolonged illness. Agencies set up to provide such insurance should comply with state statutes and regulations to insure their soundness and financial responsibility and have the approval of the county and state medical societies under which they operate.

Your committee is not willing to foster any system of compulsory health insurance. . . .

Considering particularly the question of insurance against loss of wages during sickness, the report of the committee said:

In essence, the recommendation deals with compensation of loss of wages during sickness. Your committee unreservedly endorses this principle, as it has distinct influence toward recovery and tends to reduce permanent disability. It is, however, in the interest of good medical care that the attending physician be relieved of the duty of certification of illness and of recovery, which function should be performed by a qualified medical employee of the disbursing agency.

Following the meeting of the House of Delegates in 1938 came the recommendations of the Interdepartmental Committee to Coordinate Health and Welfare Activities. This group recommended the development of social insurance to insure partial replacement of wages during temporary or permanent disability. Senator Robert Wagner of New York, in the well known proposed National Health Act, S. 1620, and in subsequent proposed legislation, also endeavored to include plans for disability compensation and indeed to provide medical service in addition to compensation.

In numerous addresses and in hearings before legislative bodies since 1938, Mr. Arthur J. Altmeyer, chairman of the Social Security Board, has continued frequently to suggest cash benefits to persons unemployed because of sickness and the provision of constructive social services to supplement cash aids, including medical care. Obviously every proposal for expansion of the social security program must, therefore, be viewed in the light of the ultimate goal set by Mr. Altmeyer. Even though the House of Delegates of the American Medical Association apparently approved unreservedly the principle of cash benefits for those sustaining loss of wages because of sickness, the provision of cash payments of \$3 a day to the

worker who is hospitalized must be considered as part of a movement toward complete plans for compulsory sickness insurance on either a cash or a medical service basis. As evidence of the apparent inseparability between disability benefits and medical and hospital care, workmen's compensation acts under which an injured worker is supplied with cash benefits for disability and also with necessary medical and hospital care, are cited.

The new proposals of the President, apparently emanating from the Social Security Board, must not be viewed in the light of circumstances as they prevailed in 1938 but in the light of conditions as they exist today. The intervening period has witnessed an extraordinary expansion in voluntary hospitalization insurance and in so-called medical service plans. Today some fifteen million persons are insured against the costs of hospitalization in a variety of agencies, including private insurance corporations, mutual nonprofit plans like the Associated Hospital Service of New York, and hospitalization plans set up on a nonprofit basis in various states. At least fourteen states and numerous counties have developed voluntary plans to cover the costs of medical care. An extensive experimentation is now in progress which should lead ultimately, if not too greatly disturbed, to the development of procedures distinctly American in their characteristics and wholly capable of meeting the needs for medical and hospital service. These are likely to be adapted to the American system of government rather than modeled after those plans of medical care and hospitalization which have prevailed in foreign countries, and which have been developed under concepts that are socialistic, communistic or totalitarian rather than democratic.

The Annual Report of the Social Security Board for 1940 indicates that that agency contemplates nothing short of a complete system of compulsory sickness insurance. Thus the report states:

Studies of illness and disability as a cause of economic insecurity were continued during the year, and consideration was given to proposals for extending the social security system to include the risk of ill health and disability.

Moreover, there are indications that the Social Security Board has been much concerned with the question

whether the development of a program of medical care in connection with the three assistance programs under the Social Security Act would assist or hamper the development of a broader program of medical care for those groups in our population who are not now able to obtain needed services.

In fact, Mr. Arthur J. Altmeyer stated his point of view positively to the Congress when he said in July 1941:

Our eventual goal should be the establishment of a well rounded system of social insurance to provide at least a minimum security to individuals and their families due to unemployment, sickness, disability, old age and death. In addition, we must provide a series of constructive social services to supplement the cash aids provided under social insurance. Medical care should be available to individuals and their families so

that we may build a healthier, happier nation. Such a system of medical care would be instrumental in reducing the costs of cash payments for sickness and disability.

From these statements it is clear that the goal of the Social Security Board is definitely a nationwide system of compulsory sickness insurance. Obviously, then, every proposal for expansion of social security must be considered in its relation to that goal.

Specifically, nevertheless, the present proposal is for the payment of \$3 for each day the worker is hospitalized. This blunt statement without qualification must, of course, be translated into proposed legislation before all its implications can be fathomed. The proponents of voluntary hospitalization and medical service plans have felt that the enactment of such legislation would sound the death knell of their voluntary proposals. Even they, however, are not of one mind in their approach to the problem. Indeed, some have indicated that they might not look askance on the proposal if the technic concerned would involve payment of the cash benefit directly to such plans rather than directly to the insured patient. This would mean recognition by the government of the prepayment plans as the official agency in the field of hospitalization and medical care. Representatives of medical and hospital service plans definitely propose that the Federal Security Administrator issue a complete endorsement of such existing prepayment plans and that he urge all communities to form similar organizations. Such a pronouncement would be premature. Most of these plans are still largely experimental; they cover, for the majority of the insured, only hospitalization and surgical fees. Few of these plans have yet secured much more than a slight majority approval of either the medical profession or the public which they would serve. Many questions as to the cost of promotion and maintenance and the character of the control of voluntary hospitalization and medical care plans remain unanswered. These were no doubt some of the considerations which caused the House of Delegates of the American Medical Association, at its 1941 session, to request the Bureau of Medical Economics to make a comparative study of medical service plans for submission to the House of Delegates in 1942. Until voluntary efforts have shown themselves incapable of meeting existing needs, they should be encouraged rather than discouraged or even destroyed by forms of government competition or intervention. By contrast government plans are costly to administer and inefficient in operation; they are even more experimental than the voluntary plans, and they function on such a huge scale as to make relief from them well nigh impossible once they are established.

Consideration of the proposed \$3 per diem payment for hospitalization costs for workers and their dependents must depend, therefore, first on the merits of the proposal itself and second on its relation to the proposed goal of a complete compulsory sickness insurance plan. Among the important objections to the \$3 per diem

payment plan is the fact that the contribution would cover only a portion of the cost of necessary hospital care as defined in most of the voluntary hospitalization plans. The establishment by the government of a fixed price per day for hospital services would inevitably tend here, as always in the past, to cause deterioration of such service to meet the fixed price. Workers would feel, no doubt, that the payment of a \$3 fee was the government's evaluation of what proper hospital service should cost. While the fee might be nearly adequate in rural areas, it would, of course, be wholly inadequate in urban centers.

The voluntary hospitals of the United States now provide an essential service to the American people. These hospitals have grown as a community interest; many of them are founded in that tenet of most religions which states that the care of the sick is one of the highest moral functions that mankind can fulfil. Federal payment and control of hospitalization costs would destroy local, religious and private community interest in the maintenance of voluntary hospitals, thus jeopardizing their future and inhibiting the initiative to assist them. The proposal involves, as one may observe from the statements of representatives of the Social Security Board, increased federal funds for new hospital construction. Already such appropriations as the government has made have tended to freeze the flow of bequests and donations for nonprofit voluntary hospitals. With these concepts in mind, representatives of various organizations in the field of the hospital are emphasizing in this critical time that the voluntary hospitals are a national asset of incalculable value, that their efficiency is traceable in large part to their freedom of action under local control and that proposed legislation should have most careful consideration from the professional and hospital point of view before it is offered to the Congress.

The American people find themselves today in the midst of a war which, this time, is in all truth a war for the salvation of democracy. Unless that war is won, such "social gains" as may have been secured will disappear along with the fundamental freedoms which prevail only under a democratic system of government. Those fundamental freedoms are more vital to the nation than any expansion of public services, or the engraftment on the body politic of new systems of payment for work, or improvement in the manner of living, or security developed by enforced savings through compulsory insurance. The American people are not averse to immense sacrifice—even to the ultimate sacrifice—if it will win the war. They should not be compelled, in the midst of such sacrifice, to consider radical proposals for changing the whole system of American living in health or in illness. The proposed expansions of the Social Security Act related to medical care should be considered in times when they can be given that type of deliberate, meticulous consideration which carefully weighs every aspect

of the problem concerned. Such proposals should not be submitted to the Congress and to the people in a period fraught with anxiety as to whether or not the nation itself will survive. Let us at the least postpone these proposals until the decision as to whether or not our democracy can successfully defend itself against ruthless totalitarianism is clear.

NIACIN AND NICOTINIC ACID

A poor name is a handicap to the promotion of a meritorious product. The name "nicotinic acid" for the vitamin so important in the prevention of pellagra has been doubly unfortunate. To the general public the word "nicotinic" implies too strongly the relationship of this vitamin to nicotine, the chief alkaloid of tobacco often used as an insecticide. The term "acid" denotes a corrosive substance such as the liquid used in automobile storage batteries. The vitamin called "nicotinic acid" was first produced in the laboratory in 1867 by the oxidation of nicotine with potassium chromate and sulfuric acid. Later the compound was named nicotinic acid because it had been made from nicotine and it had the ability to form salts. As a laboratory curiosity, which it remained for over seventy years, nicotinic acid was adequately named. From the point of view of those interested in furthering the distribution of foods enriched with this dietary essential, the name has proved unsuitable.

Following the announcement of proposed regulations for enriched bread by the Food and Drug Administration, a well known trade publication announced the event with the heading "Tobacco in Your Bread" because nicotinic acid happened to be one of the dietary essentials which is added to the product. Although nicotinic acid was first produced from nicotine, and even now a small proportion of this substance is being produced commercially in this manner, the implication that tobacco is contained in enriched bread is far from true. Most of the nicotinic acid of commerce is produced by the oxidation of beta-methylpyridine, a coal tar derivative. Although nicotine is a toxic substance, nicotinic acid is a vitamin essential to life.

As reported elsewhere in this issue¹ a committee of the Food and Nutrition Board of the National Research Council has selected as suitable synonyms "niacin" for nicotinic acid and "niacin amide" for nicotinic acid amide. The Council on Foods and Nutrition has approved these synonyms for preparations that come within its scope. The choice of niacin appears to be a happy one. The name is not therapeutically suggestive. Although niacin is not altogether suitable from the purely chemical point of view, chemists and other scientists generally will continue to use the older terms, which to the initiated are unobjectionable. Whether the new names will overcome resistance to the greater use of enriched flour and enriched bread remains to be seen. They deserve to meet general approval.

Current Comment

TSUNEYOSHI KOBAYASHI MEETS THE F. B. I.

The Baltimore *Sun* of February 17 reports the arrest of Tsuneyoshi Koba, celebrated medical impostor, by the Baltimore office of the Federal Bureau of Investigation. THE JOURNAL published an article concerning Koba, his various aliases and his various attendance at Johns Hopkins University School of Medicine in the issue of Nov. 16, 1940. A previous article concerning him appeared in THE JOURNAL, Aug. 1, 1931. Of particular interest was his claim at the time of his arrest that he was planning to make his residence in Baltimore once again and to seek employment as an intern at one of the Baltimore hospitals. He was taken into custody in an enemy alien roundup, on warrants charging him with failure to obtain permission to travel as a Japanese alien from St. Louis to Baltimore, failing to possess an alien registration card and falsely representing himself to be an American citizen while traveling under an assumed name. The new name, which is considerably different from the previous aliases—Koba, Kuba, Matuzaki and Matsuzaka—is Masami Iwataki Kanda. The news item referred to called attention to the various articles which have appeared in THE JOURNAL and stated that he had in his possession a portable radio with short wave receiving band, an expensive wig and face lotions for bleaching the skin among other things in his sixteen pieces of luggage. The item further stated that Koba had admitted to the federal agents many of the facts which were disclosed in THE JOURNAL articles. Possibly it did not occur to Koba of the many aliases that the Federal Bureau of Investigation would be interested in the facts disclosed about him in THE JOURNAL.

A NEW IDEA IN HEALTH EDUCATION

Health educators say that audiences are where you find them and that one needs merely speak in terms familiar to those one would reach and influence. Seldom are convictions in such tangible form as in the newly issued Nebraska Health Almanac.¹ This book resembles the old fashioned "patent medicine" almanacs. Interspersed with the other items are many relating to medical history, not only in the larger sense, but local to Nebraska. A two page spread is devoted to each month. On the left hand page is the calendar, with a special brief illustrated health suggestion. Beginning with January, these deal month by month with safety on Nebraska highways, whooping cough, typhoid, food and the teeth, safe water, the common cold, the home medicine cabinet, rabies, infantile paralysis, encephalitis, adequate diet and mental hygiene in the home. On the right hand pages are articles dealing with various phases of health and the work of the state health department in Nebraska. At the end of the volume are a few pages devoted to cancer, the school health program, athletics, venereal diseases, health of the eyes, and a year's summary of vital statistics. This almanac should make an effective instrument in health education.

1. Niacin and Niacin Amide, this issue, p. 819.

1. Department of Health, State of Nebraska, Lincoln, 1942.

MEDICINE AND THE WAR

In this section of The Journal each week will appear official notices by the Committee on Medical Preparedness of the American Medical Association, announcements by the Surgeon Generals of the Army, Navy and Public Health Service, and other governmental agencies dealing with medicine and the war, and such other information and announcements as will be useful to the medical profession.

VENEREAL DISEASE CONTROL OFFICERS

The War Department announced on March 5 that specially qualified medical officers would be assigned to control and prevent the spread of venereal diseases among American troops. Supplementing the program already in effect, a venereal disease control officer with the grade of major will be assigned to each army camp of 20,000 or more men, each field army, air force and armored force, each corps area or department, each division, general headquarters and headquarters, communications zone. While the control measures employed by the Army in recent years have produced a satisfactory decline in disease rates and have been adequate for peace time, the change to a war time status introduces new conditions requiring additional control measures. The new control officers will function within the Army and with civil agencies, cooperating with other health agencies in stamping out possible sources of infection.

Within the military commands, measures to be taken to assure prompt and adequate control include:

1. Supervision, coordination and improvement of the venereal disease educational program
2. Cooperation with other military agencies in order to provide an adequate recreational program
3. Cooperation in the provision and maintenance of adequate facilities for prophylaxis.
4. The provision of adequate physical inspections of troops to detect early such cases as may cause failure to report at sick call
5. The provision, standardization and supervision of facilities for the diagnosis and treatment of infected military personnel
6. Close cooperation with local civilian health authorities to insure the reporting of probable civilian sources of infection which occur among soldiers in order to assist the civilian agencies in the elimination of foci of infection
7. The collection and detailed analysis of data concerning the incidence and sources of infections acquired in the troops of the respective organizations

In the civilian communities the control officers will cooperate with all agencies concerned in the control of venereal diseases to insure the effective repression of prostitution and the adequate quarantine and treatment of infected civilians, as a measure to prevent infection of soldiers. Cooperation will be carried out with the Bureau of Medicine and Surgery of the U. S. Navy, the Division of Social Protection and the Public Health Service of the Federal Security Agency, the Federal Bureau of Investigation, health and law enforcement agencies of states and smaller political units, and certain unofficial agencies such as the American Social Hygiene Association.

ARMY SPECIALIST CORPS FORMED

To marshal unusual scientific, technical, labor and business skills directly into the Army, the War Department announced the creation on February 27 of the new Army Specialist Corps, under an executive order signed by the President. Mr. Dwight F. Davis, Secretary of War from 1925 to 1929, will head the new corps. Since it will be necessary to form an organization and draft regulations, applications for service with the corps should be withheld pending further announcement.

The War Department plan provides that the Army Specialist Corps will establish, under military control and in distinctive uniform, a selected body of skilled individuals to supply all arms of the service and all echelons of the Army. The corps will consist mostly of uniformed civilians highly qualified in professional, labor and scientific fields but who do not necessarily have to possess military knowledge and training. It will place wherever needed, including the theaters of operations, men of exceptional skill in the many technical services necessary to a

modern army. In other cases Specialist Corps members, experienced in the administrative field, will release Army officers from administrative posts so that they may take up the combat and command duties for which they are specially trained. Except in special cases, appointments will be made of men over the active draft age.

A feature of the corps will be the adaptability of the physical requirements for entrance to the particular assignment, so as not to bar especially qualified men from service. The members of the corps who are to serve with troops in the field will, of necessity, have to pass the same physical examination as members of the Army. The facilities of the Civil Service Commission, contacts with national organizations and the many applications already on file in the War Department will be available to the corps. In some cases it may be necessary to train selected personnel for particular positions. In general, the purpose is to gain the services of the best qualified civilians for each essential position.

COMMISSIONS IN ARMY RESERVE OPEN TO MEDICAL SCHOOL LOWER CLASSMEN

Provision for appointing physically qualified first and second year male students at approved medical schools, and bona fide accepted matriculants as well, as second lieutenants in the Medical Administrative Corps, Army of the United States, was announced on March 4 by the War Department. Officers appointed in this manner will not be called to active duty until they have completed their medical studies and internships and have qualified for appointment as first lieutenants in the Medical Corps. Previously only juniors and seniors in medical schools came under these provisions. The change broadens the base of procurement and assures the Army Medical Corps of a steady yearly increment of new officers for its reserve components.

Applications for commissions in this group are to be made through the dean of the medical school, who will forward the application and accompanying papers to the commanding general of the corps area in which the school is located. A certified statement that the applicant is a bona fide accepted matriculant in medicine at the institution is required.

Officers appointed under these provisions will be discharged for the convenience of the government if they discontinue their medical education, matriculate at an unapproved school of medicine, fail to complete successfully the prescribed four year course of medical instruction or fail appointment in the Army of the United States within one year after completion of the prescribed four year course of medical instruction. Students at approved schools of medicine, dentistry or veterinary medicine who already hold reserve commissions in other arms or services will not be ordered to active duty while completing their studies. Successful completion of their courses will qualify them for transfer as first lieutenants in the Medical Corps, Army of the United States.

INCREASE IN VENEREAL DISEASE IN ARMY

In his annual report to the Secretary of War, the surgeon general of the army, Major Gen. James C. Magee, is reported to have stated that the admission rate for all venereal disease for the whole army for the year ended June 30, 1941 was 42.5 per thousand strength in 1940, as compared to 29.6 in 1939. In explanation of the increase, the report stated in part that although men enlisted and inducted are given a thorough phys-

cal examination, a number of cases are detected shortly after entrance into the service and these are cases which escaped detection or were still in the incubation period at the time of physical examination. The report stated also that discontinuance of the policy of trial by court martial of soldiers developing venereal disease after failing to take prophylaxis may have had something to do with the increased rate. The rapid expansion of the army and its concentration in many training camps was considered another factor. The report revealed that the death rate in the army, excluding battle casualties, was at its lowest rate in history during this period, with a death rate of 2.8 per thousand strength. The average number of medical personnel in military hospitals, however, increased from an average daily low of 4,753 in 1939 to 8,300 in 1940. There were 19,609 cases of influenza treated during the year, yet only 0.3 per cent developed into pneumonia. Automobile accidents was the principal cause of death in the army during that period.

PHYSICAL REHABILITATION OF REJECTED REGISTRANTS

National Headquarters, Selective Service System, has announced that tests of a physical rehabilitation program, intended to make many registrants who were rejected because of minor physical defects fit for active military service, have been authorized in Maryland and Virginia.

Authorization of the rehabilitation programs in the two states marks the beginning of a long-planned nationwide physical rehabilitation campaign. When the results of these pilot tests are evaluated, a date for the inauguration of the national program will be set. Only those registrants whose disabilities are certified by the Army as being remediable will be eligible to undergo treatment. As one of the first steps in the Maryland and Virginia test programs, the director of Selective Service of each state will submit to National Selective Service Headquarters lists of physicians and dentists qualified to correct physical defects of registrants. Physicians and dentists designated to render these authorized professional services will be paid by the federal government.

National Headquarters emphasized that any physician or dentist can apply to be designated to assist in the rehabilitation program. Physicians and dentists not already designated by registrants as their choice for dental or medical treatment, and other physicians and dentists who wish to take part in the program, may obtain the necessary application forms from their local boards.

GRADUATION AT CARLISLE BARRACKS

A class of three hundred and forty-four officers of the U. S. Army Medical Department graduated at the Medical Field Service School, Carlisle Barracks, Pa., February 28, following a two months course of instruction in military duties in the field, consisting of field demonstrations, lectures and home study in military art, sanitation, logistics, field medicine and administration. The members of the class, who left immediately after the ceremony to join their respective units, numbered two hundred and thirty-three officers of the medical corps, seventy-seven officers of the dental corps, twelve officers of the veterinary corps, sixteen of the medical administrative corps, four officers of the sanitary corps, one infantry officer and one field artillery officer. Two hundred and eighty-two of these officers were from the medical reserve corps, forty-one from the National Guard and twenty-one from the regular army. This was the tenth officers class to be graduated from this school recently; the eleventh officers' class will begin instructions on March 9.

Major Gen. James C. Magee, surgeon general of the army, in his address to the class, pointed out that the tempo is accelerating daily. All physician members of the class were graduates of accredited medical schools. He said that there is also urgent need for qualified technicians. The requirement for

these enlisted specialists for an army of 3,600,000 will be about as follows: x-ray technicians, 6,044; laboratory technicians, 8,796; medical technicians, 47,870; surgical technicians, 34,681; sanitary technicians, 7,042; pharmacy technicians, 5,192, although equally important and highly trained specialists run into about the same figures. In addition to the foregoing, replacement training center facilities are available with a training capacity of 30,942 per cycle of training, including clerks, cooks, bakers, automobile mechanics, truck drivers and other basic specialists.

In regard to officer training, there is a great inadequacy to meet the combined needs for the treatment of sick and wounded incident to combat, in addition to the civilian needs of orthopedic surgeons, thoracic surgeons, neurosurgeons, maxillofacial surgeons and others. It is planned to set up specific training areas for the training of various types of specialists.

General Magee said that some members of this class will be assigned to such duties as the procurement, issue and storage of supplies and that today there is constructed or authorized 8,000,000 square feet of storage for medical depots, whereas in September 1940 the medical department was utilizing only about 1,203,000 square feet of floor space. The present medical department plans for procurement of supplies and equipment call for an expenditure forty to fifty times greater than that of 1939.

In July 1940, the army had about 17,950 hospital beds and on Feb. 1, 1942, the number had been increased to 80,000, and this it is expected will be greatly increased.

General Magee urged the graduates to put forth their most earnest effort and cooperation whatever their assignment in the pursuit of their everyday duties. War presents the opportunity to assemble a large body of physicians into a single cooperative effort, which is bound to be productive of great medical benefits. The medical profession, he said, will come out of this conflict enriched in knowledge, and the standards of the medical department of the army will be raised to a level even higher than those of the past, which are filled with valorous deeds and contributions to the general good of medical knowledge.

SELECTIVE SERVICE BOARDS AND PROCUREMENT AND ASSIGNMENT

Following publication of the description of the Procurement and Assignment Service for Physicians, Dentists and Veterinarians in *THE JOURNAL*, February 21, page 625, there seems to have been some misunderstanding among some physicians, dentists and veterinarians as to the exact relationship of the Procurement and Assignment Service to the Selective Service. Those in doubt should read again the memorandum signed by the Director of the Selective Service, Brig. Gen. Lewis B. Hershey, to all state directors of the Selective Service System on January 28. In that memorandum General Hershey said "When considering the classification of any registrant who is a qualified medical doctor, dentist or doctor of veterinary medicine, the Director of Selective Service desires that local boards, through the State Director, shall consult the Procurement and Assignment Committee of the Corps Area for information as to the availability of qualified medical doctors, dentists and doctors of veterinary medicine in the community. This information shall be considered by the local board in determining the registrant's classification. The executive order referred to [from the President] in no way affects the authority of the Selective Service System to classify registrants."

The professional groups concerned should again be reminded that the final authority to decide whether or not a physician, dentist or veterinarian is essential in his community in the profession which he occupies rests with the Selective Service board. From this decision a physician, dentist or veterinarian has, of course, the same right to appeal as would a person in any other occupation. The Procurement and Assignment Service through the corps area representative is authorized to supply verified information. The decision rests with the Selective Service board.

ORGANIZATION SECTION

MEDICAL LEGISLATION

MEDICAL BILLS IN CONGRESS

Changes in Status.—S. 1842 has been reported to the Senate with a recommendation that it pass, proposing to extend the benefits of the Soldiers' and Sailors' Civil Relief Act in connection with mortgages and instalment contracts to transactions originating subsequent to Oct. 17, 1940. Under existing law relief is provided by the act only with respect to such transactions as originated prior to the date named. S. 2208, a bill further to expedite the prosecution of the war, has passed the Senate and has been favorably reported to the House. This bill, among other things, proposes to make available the benefits of the U. S. Employees' Compensation Act to "any person in the protective services engaged in civilian defense, who has been duly appointed as such by an officer or agent of the United States acting under lawful authority." H. R. 6446 has passed the House and Senate, providing for continuation of payment of pay and allowances of personnel of the Navy, Marine Corps and Coast Guard, including the retired and reserve components thereof, and civilian employees of the Navy Department, during periods of absence from post of duty and for other purposes. This bill, among other things, provides for the postponement of the filing of federal income tax returns and the payment of federal income taxes by (a) any individual in the military or naval forces of the United States, (b) any civilian officer or employee of any department who is a prisoner of war and (c) any individual in the military or naval forces serving on sea duty or outside the continental United States.

Bills Introduced.—S. 2260, introduced by Senator Doxey, Mississippi, and H. R. 6606 and H. R. 6588, introduced by Representative Colmer, Mississippi, propose to strike from the Federal Food, Drug and Cosmetic Act the requirement that inspections of sea food may be made by the federal officials only when payment of certain inspection fees is made by the packer of the sea food. H. R. 6648, introduced by Representative Green, Florida, proposes that drugs shall be dispensed by the government of the United States, the government of the District of Columbia and the governments of the territories and possessions of the United States, including the Canal Zone, only under the direction of graduate registered pharmacists.

DISTRICT OF COLUMBIA

Change in Status.—S. 2154 has passed the Senate, proposing to amend the healing arts practice act of the District of Columbia by imposing a citizenship requirement on applicants for licenses to practice the healing art.

STATE MEDICAL LEGISLATION

Kentucky

Bill Introduced.—H. 356 proposes to authorize the state board of health to make such rules and regulations as may be necessary to control the actions of local boards of health when the members of such local boards fail to execute their duties under the health laws of the state.

Mississippi

Bills Introduced.—S. 274 proposes to authorize the board of trustees of state eleemosynary institutions to establish, equip, operate, support and maintain a state industrial institution and farm to be used as a place for the detention, direction, supervision, vocational training, care and education of any females convicted under the state, county or city laws against prostitution; and for the isolation and treatment of females afflicted with an infectious venereal disease. S. 277 proposes to create

a board of trustees for hospitals to formulate and prescribe standards, rules and regulations for the operation, governing and licensing of hospitals in the state of Mississippi. The term hospital is defined as "any institution, hospital, sanitarium, infirmary or clinic organized and/or used for the prevention, diagnosis and treatment of physical, mental and medical ailments and where minor or major surgery is being done and where functional facilities may be available for training new workers in the many special professional, technical and economical fields relative to the discharge of its proper functions and which complies with the standards, rules and regulations" promulgated by the board of trustees for hospitals. The provisions of the proposed bill would not apply to offices or clinics in which only examinations, minor surgery and emergency surgery to the injured is being done and in which patients are kept for observation and for short periods of treatment; nor would they apply to any place used for the treatment of emergencies produced by war injuries, tornadoes, fires, floods or other catastrophes that may occur in the state. H. 394 proposes the establishment of three state charity hospitals and nurses' homes in the northern part of the state and provides for their control and management.

New York

Bills Introduced.—S. 871, to amend the public health law, proposes to authorize the department of health to designate as a special emergency health and sanitation area any area within the state which, because of the existence of any military or naval establishment, might produce unusual problems of health and sanitation; and to make and enforce rules and regulations for such area designed to obstruct and prevent the introduction of any contagious or infectious disease and to safeguard the public health. S. 879 and A. 1097, to amend the education law in relation to the practice of medicine, propose that nothing in the medical practice act shall prevent the practice of medicine by an intern while serving in a state hospital or that of a political subdivision of the state. S. 882 and A. 1117, to amend the domestic relations court act of the city of New York, propose to authorize that court to order each actual or alleged parent and the child to submit to one or more blood grouping tests by a duly qualified physician to determine whether or not any person disclaiming parenthood may be excluded as the parent of the child; and the results of such tests may be received in evidence but only in cases where definite exclusion is established. S. 888 and A. 469, to amend the law in relation to the establishment of adequate physical examinations and health service in vocational schools, propose that the board of education shall provide health service for pupils attending vocational schools. Such health service shall include "the necessary facilities to afford adequate physical examinations, including x-raying of the chest of all pupils in vocational high schools annually." No physical examination shall be required of any pupil who presents a health certificate on entrance to the school, and nothing in the proposed bill would affect the right of the parent or guardian to determine the form or manner of treatment or remedial care to be prescribed for such pupil. A. 994, to amend the law in relation to the disclosure of professional information, adds the professions of dentistry and pharmacy to the coverage of the existing law. A. 1058, to amend the labor law in relation to the manufacture of food products, proposes to prevent any person from working in a factory wherein a food product is manufactured who has a communicable or contagious disease which is transmittable through food, or who is suffering from any condition which may cause contamination of food. S. 959 and A. 1218, to amend the education law, propose that, with the exception of sales to the state, any of its political subdivisions or to hospitals or dispensaries, practicing physicians,

dentists or veterinarians, no manufacturer or wholesaler shall sell any poisonous, deleterious, and/or habit forming proprietary medicine unless it has registered in accordance with the provisions of the law. A. 1144, to amend the mental hygiene law, proposes to extend the scope of the act to include the mentally sick and proposes to add regulations for the commitment, custody, maintenance and discharge of such mentally sick persons. S. 1047 and A. 1155, to amend the workmen's compensation law, proposes to authorize podiatrists to render services under such law whenever the care required for an injury to an employee's foot is such that it may lawfully be treated by a duly registered and licensed podiatrist. Podiatrists would then be subject, so far as may be practicable, to the provisions of the labor law and the workmen's compensation law which apply to physicians relative to performance of necessary duties and relative to unprofessional conduct. A. 1212, to amend the hospital lien law, proposes a procedure for the determination and fixing by a court of the reasonableness of any lien filed by a hospital. S. 1098, to amend the workmen's compensation law, proposes to authorize duly licensed optometrists to render services to injured employees when the services to be rendered are of a nature which can lawfully be cared for by a duly registered and licensed optometrist in the state of New York. The bill also proposes to authorize the commissioner to prepare and establish a schedule of minimum charges and fees for such optometric treatment and care. S. 1054, to amend the insurance law, proposes to authorize hospital service corporations to supplement contracts for hospital service which they now write by

adding the furnishing of indemnity against physicians' fees for surgical and obstetric care. A. 905 proposes to provide for the establishment and administration of a compulsory system of health insurance for the benefit of defined employees earning less than \$1,500 a year. A. 1267, to amend the public health law, proposes to provide for reimbursement to any hospital of the state for emergency services rendered to a person who is unable to pay therefor.

Virginia

Bills Introduced.—H. 357, to amend the law relating to the duties of local health authorities, proposes to require a local authority to investigate and report any cases of certain specifically named communicable, contagious, infectious or dangerous diseases. H. 421, to amend the alcoholic beverage control act, proposes that alcoholic beverages may be sold only in drug stores, only for medicinal purposes and only on a physician's written prescription. S. 219, to amend the law relating to the sale of certain hypnotic drugs, proposes that the term "dangerous drug" shall include, in addition to those covered by the present law, the following: "Sulfanilamide (para-amino-benzene-sulfonamide), Sulfathiazole, Sulfapyridine, Sulfadiazine, Sulfaguanidine and any Sulfanilamide derivatives by whatsoever trade name or designation; or any related compound, preparation, mixture or salt thereof; or any salt or derivative thereof; or any preparation or mixture containing any of them." These drugs may be sold only on a physician's prescription, which may not be refilled.

MEDICAL ECONOMIC ABSTRACTS

PATIENTS IN HOSPITALS FOR MENTAL DISEASE

There were 395,683 patients in average daily residence in one hundred and seventy-eight state and two federal hospitals for mental disease in 1939. There has been an increase of 56.5 per cent in the number of patients since 1926. According to a special report of the Bureau of Census, January 31, this increase in population is due partly to "increased capacity of hospitals, to a growing awareness of the needs for early treatment, to an increase in population, to a lengthening average life span and shifting age distribution of the population resulting in greater exposure to the risk of hospitalization in those age groups in which the rate of prevalence of mental disease is highest, and to the demands that increased urbanization makes of the individual."

The American Psychiatric Association in 1926 set up certain standards for mental disease hospitals calling for an adequate medical staff with not less than one well qualified physician for every 150 patients and not less than one nurse for every 8 patients. "In the United States the patient load per assistant physician and medical intern was 245.2" says this report. "This is 60 per cent higher than the standard maximum. Many hospitals report patient-physician ratios several hundred per cent in excess of the maximum. Since adequate medical personnel is the first step in providing efficient treatment, it is evident that many patients are decidedly handicapped at the outset."

There were nearly sixteen state hospitals in which the rated capacity of the institution was exceeded by more than 15 per cent and overcrowding is "increasingly acute in some hospitals."

The ratio of discharge in 1939 was 183.2 per hundred deaths as compared with the ratio of 126.5 in 1926. The one hundred and eighty state hospitals cared for 84 per cent of the total patients hospitalized for mental diseases. These hospitals expended \$118,388,218 in maintenance in 1939 in addition to what was spent for capital outlay.

EXAMINATIONS FOR TUBERCULOSIS

The fact that need for a service does not create a desire was illustrated once more when the Detroit Department of Health had nurses canvass 196,000 persons in the low income group to offer them an opportunity to be examined for tuberculosis. Although arrangements were made to give the examinations without cost to those unable to pay for them, only about 17 per cent of the white population and 40 per cent of the Negro population reported for examination. In both populations the best response was obtained from the age group 5 to 14 years. This is not the age in which the greatest number of relative cases were found. The report of the study by Dr. G. E. Harmon in the February issue of the *American Journal of Public Health* and the *Nation's Health*, page 187, summed up the results as follows:

1. The response was greatest in the younger age groups, especially the 5 to 9 and 10 to 14 groups.
2. The Negro population responded more than twice as well as the white.
3. The age of greatest response was not the age of the highest tuberculosis case rates.

WOMAN'S AUXILIARY

Utah

The Woman's Auxiliary to the Salt Lake County Medical Society met at the Reception Center at Fort Douglas recently. The president, Mrs. Charles E. Brain, greeted the auxiliary members and also guests from out of town. She introduced Utah's only woman state senator, Mrs. E. E. Ericson. Col. H. P. Kyser explained the organization of the Reception Center

and all the coordinating units. From 80 to 100 men are admitted daily and stay three to four days before being sent to training camps. The local boards report that 50 per cent are disqualified, mostly because of defective teeth. Luncheon was served in the mess hall to ninety-six members and guests, after which tours were conducted through the buildings by commissioned officers, who explained the organization in detail.

Medical News

(PHYSICIANS WILL CONFER A FAVOR BY SENDING FOR THIS DEPARTMENT ITEMS OF NEWS OF MORE OR LESS GENERAL INTEREST: SUCH AS RELATE TO SOCIETY ACTIVITIES, NEW HOSPITALS, EDUCATION AND PUBLIC HEALTH.)

ARKANSAS

Officers of the State Board of Health.—Dr. Thomas Wilson, Wynne, has been elected president of the Arkansas State Board of Health; Dr. William G. Hodges, Malvern, vice president, and Dr. William B. Grayson, Little Rock, secretary, reelected.

CALIFORNIA

Rheumatic Fever a Reportable Disease.—The California State Department of Health recently added rheumatic fever to its list of reportable diseases, effective on January 1. According to *Western Public Health*, the department now has fifty diseases on its group for compulsory reporting.

Physician Members of Safety Council.—Three physicians were among the twelve new directors appointed to the California Safety Council recently, according to a report in *California and Western Medicine*. They are Drs. John C. Irwin, Los Angeles; Elliot A. Rouff, San Jose, and Charles A. Dukes, Oakland, formerly president of the California Medical Association.

Dr. Smyth Named Dean at California.—Dr. Francis S. Smyth, professor of pediatrics at the University of California Medical School, San Francisco, has been appointed dean of the school. Robert G. Sproul, LL.D., president of the university, has been acting dean of the school. The deanship has been vacant since the retirement on Dec. 31, 1939 of Dr. Langley Porter. Dr. Smyth graduated at California in 1922. Subsequently he served on the staffs of the Children's Hospital, Boston, New York Nursery and Childs Hospital, New York, and the St. Louis Children's Hospital, St. Louis. In 1932 he returned to the University of California. He is a member of the editorial board of the *American Journal of Diseases of Children*.

CONNECTICUT

Society News.—The New London County Medical Association was addressed in Norwich, January 8, by Dr. Frank H. Lahey, Boston, on "Lesions of the Esophagus, Stomach, Duodenum and Jejunum."—The Fairfield County Medical Association was addressed in Stamford in October by Dr. Eugene L. Swan, Brooklyn, on "Emotional Problems in Children."

New Unit at Neuro-Psychiatric Institute.—A new eight story science building is under construction at the Neuro-Psychiatric Institute of the Hartford Retreat, Hartford. Originally designed for scientific research exclusively, the building has been planned for emergency hospital expansion with between two and three hundred emergency beds with complete hospital facilities to supplement the emergency service of the nearby Hartford Hospital. The unit will contain technical laboratories for medical research in electroencephalography, cardiography, surgery, gynecology, eye, ear, nose and throat, neurology, endocrinology and orthopedics. The double second story will house the Jelliffe Library and the medical collection of the institute. Dr. Margaret A. Daley, Hartford, was recently added to the staff of the institute as a fellow in psychiatry.

ILLINOIS

Society News.—Dr. Ralph A. Kinsella, St. Louis, discussed "Virus Pneumonia" before the Madison County Medical Society in Highland, February 6.—Dr. Otto L. Bettag, Pontiac, addressed the Kankakee County Medical Society, Kankakee, January 13, on "The Differential Diagnosis of Chest Diseases."—Dr. Philip Lewin, Chicago, addressed the Peoria Medical Society in Peoria, February 3, on "Backache and Sciatica" and Dr. James S. Altman, Springfield, February 17, poliomyelitis.

Chicago

School for Tuberculosis.—The City of Chicago Municipal Tuberculosis Sanitarium has been conducting a postgraduate school of tuberculosis, consisting of three two hour sessions a week and running for about two months. The school aims to carry tuberculosis instruction directly to the physicians, and the sessions are held at some neighborhood location convenient

of access for the particular group of physicians interested. The school awards a diploma to physicians showing more than 70 per cent attendance. Ninety-five Negro physicians graduated in the series conducted on the south side. Thirty physicians completed a recent course at the West Suburban Hospital, Oak Park, Ill. A complete history of tuberculosis is presented, covering the demonstration of bacilli, examination of slides and stressing the use of the x-rays. Members of the staff of the Municipal Tuberculosis Sanitarium are the instructors.

INDIANA

New Coroners Named.—Dr. Enoch E. Long, Shoals, has been made coroner of Martin County.—Dr. Colonel G. Mackey, Culver, has been appointed coroner of Marshall County to succeed Dr. Frederic G. Perry, Plymouth, who resigned to become health officer of the county.—Dr. Joshua L. Blaize, Vincennes, has been named coroner of Knox County.

Tribute to Dean of Pharmacy.—Purdue University, Lafayette, has published "A Book of Tributes to Charles Bernard Jordan," dean of the School of Pharmacy from 1924 until his death in April 1941. The book contains many tributes from colleagues and professional societies and carries a reproduction of the illuminated parchment presented to him in honor of his twenty-five years of service to the university. Dr. Jordan joined the Purdue staff in 1910 as head of the department of pharmacy and professor of pharmaceutical chemistry. Under his leadership, the department of pharmacy became a school in 1924 and he was named dean.

Immunization Survey of Children Under Ten Years of Age.—The Indiana State Board of Health has been conducting a statewide immunization survey to determine the number of children under 10 years of age in the state who have been given protective measures against smallpox and diphtheria. According to a preliminary report, 14,547 children in this age group were included in the survey. Of the 5,840 children under 6 years of age included in the total group, 19 per cent had diphtheria immunization and 9 per cent were vaccinated against smallpox. Only 34 per cent of the children in the group under 10 years had been immunized against diphtheria, and only 23 per cent had been given smallpox vaccinations. It is estimated that in Indiana there are about 600,000 children in this age group. So far the study emphasizes the need for more attention in the preschool age groups. Stress is placed on the fact that in 1940 about one third of all diphtheria deaths in the state were among children below 5 years of age.

KENTUCKY

District Meeting.—The Pulaski County Medical Society recently was host to a meeting in Somerset of the Sixth and Seventh district medical societies and to physicians of Barren, Bell, Knox, Whitley, Laurel and Madison counties. The speakers included:

Drs. Addie M. Lyon, director of the division of hospitals and mental hygiene, state department of welfare, Frankfort, Our Obligation to the Mentally Ill.

Dr. John E. Edwards, Lancaster, Use of the Various Members of the Vitamin B Complex.

Dr. Jennings B. Marshall, Louisville, Clinical Use of Stilbestrol.

Dr. William T. Maxson, Lexington, Vitamin K in the Prevention and Treatment of Hemorrhagic Disease of the Newborn.

Dr. Carl H. Fortune, Lexington, Sulfadiazine.

Changes in Health Officers.—Dr. Andrew B. Colley, Dixon, has succeeded Dr. George B. Davis as health officer in Grayson County. Dr. Colley will divide his time between Grayson and Hart counties with headquarters in Leitchfield, and Dr. Davis will move to Connecticut, it is reported.—Dr. Edwin Bruce Underwood has been placed in charge of the Webster County Health Department to succeed Dr. Colley.—Dr. John D. Fouts, London, health officer of Laurel County, has been appointed director of venereal disease control for the city of Louisville, and Dr. Leonard A. Crosby, Elketon, has been placed in charge of the health units in Lyon, Trigg and Caldwell counties.

MARYLAND

Symposium on Emergency Treatment.—The Baltimore City Medical Society devoted two meetings in February to a symposium on emergency treatment. The speakers, all of Baltimore, included:

Dr. Arthur M. Shipley, Immediate Treatment of Wounds, Especially Thoracic and Abdominal.

Dr. Robert W. Johnson Jr., Injuries to Bones, Joints and Muscles.

Dr. Edward A. Kitowski, Burns.

Dr. Edward F. Lewison, Captain, medical reserve corps, U. S. Army, Emergency Treatment of Chemical Warfare Casualties.

There were demonstrations of the use of splints, both ready made and improvised and of methods of transportation of the

wounded, as taught by the American Red Cross, and of methods of artificial respiration, both manual and mechanical, as used by the Baltimore City Fire Department.

MICHIGAN

Institute on Nutrition.—The Michigan Nutrition Defense Committee and the Michigan State College, East Lansing, sponsored a nutrition institute at the college, February 4. The speakers included:

Helen S. Mitchell, Ph.D., Washington, D. C., principal nutritionist, Office of Emergency Management, Office of Defense Health and Welfare Service, The National Nutrition Program.
Janice Smith, Ph.D., of the Ellen H. Richards Institute, Pennsylvania State College, Nutrition and the Nation's Fitness.
Marie Dye, Ph.D., dean of division of home economics, professor of foods and nutrition, Michigan State College, The Michigan Nutrition Program.

There was a round table on "nutrition in action" and a food demonstration on "Meat in the National Nutrition Program." A coordinating committee has been appointed by the governor to relate the work of the Michigan Nutrition Defense Committee with that of the Michigan Council of Defense. There are six members on the new committee, which is to be known as the Michigan Nutrition Committee.

MINNESOTA

Personal.—The University of Minnesota and the University of Minnesota Press, Minneapolis, recently held a reception in honor of members of the Mayo family and Helen B. Clapesattle, author of "Doctors Mayo."—Dr. Charles E. Caine has been named mayor of Morris.—John E. Anderson, Ph.D., professor and director, Institute of Child Welfare, University of Minnesota, Minneapolis, has been appointed chairman of the Minnesota committee of the White House Conference on Children in a Democracy.

Abortionist Convicted.—Fred Wells, Buffalo Lake, was found guilty by a jury in the district court of Renville County, December 12, having been charged with the crime of abortion. Judge Harold Baker sentenced Wells to a term of not to exceed two years of hard labor at the state prison at Stillwater. Before his trial, Wells had pleaded not guilty to the charge. Wells, who for more than twenty-five years had been a rural mail carrier, had no medical education of any kind. Evidence was offered to show that Wells had performed a previous operation on the same girl. The defendant admitted that he had completed only the fifth grade in school.

Grants to the University of Minnesota.—*Minnesota Medicine* announces the following recent gifts to the University of Minnesota, Minneapolis: \$7,000 from the Citizens' Aid Society to support research on gastric ulcer under Dr. Owen H. Wangenstein, professor and head of the department of surgery at the medical school, to be used over a two year period; \$4,700 from the National Research Council for research on fat metabolism; \$2,500 from the National Confectioners Association for use by Ancel Keys, Ph.D., professor of physiology, in his study on diet and fatigue; \$2,000 from the John and Mary R. Markle Foundation, New York, as a supplementary grant to support the work of Dr. Albert V. Stoesser, associate professor of pediatrics, on water-electrolyte metabolism in intractable asthma; \$1,200 from the W. H. Barber Company for the Ivar Sivertsen Foundation for cancer research, and \$1,000 from an anonymous donor through the Minnesota Medical Foundation to establish a research problem in the division of internal medicine.

MISSISSIPPI

Personal.—At a recent meeting, the Central Medical Society paid special tribute to Dr. Harvey F. Garrison, Jackson, who recently was named president-elect of the Southern Medical Association. Dr. Seale Harris, Birmingham, Ala., was the guest speaker on "The Food Factor in Winning the War and the Physician's Responsibility."

Society News.—The East Mississippi Medical Society was addressed recently in the Lamar Hotel, Meridian, by the following members of the University of Tennessee College of Medicine, Memphis, Tenn.: Drs. William L. Simpson, "Throat Infections as Seen by the General Practitioner"; Arthur G. Jacobs, "Nutritional Deficiencies of Infancy and Childhood," and James M. Bethea and Charles H. Avent, who discussed the gallbladder from the standpoint of the internist and surgeon, respectively.

MISSOURI

Personal.—Dr. Ira H. Lockwood, Kansas City, has been appointed a member of the state board of health, succeeding Dr. Howard B. Goodrich, Hannibal.—Dr. Hal Foster, Kansas City, who was the second secretary of the Jackson County

Medical Society, and first secretary of All Saints' Hospital, now St. Luke's, has given his collection of books to the Jackson County Medical Society, following his retirement after sixty years in the practice of medicine.

Society News.—Dr. Drew W. Luten discussed "The Favorable Prognosis of Coronary Disease" before the St. Louis Medical Society, February 3, and Dr. Oswald P. J. Falk, "Management of Acute Coronary Occlusion Favoring Recovery." Both are from St. Louis.—Dr. Eugene A. Miller, St. Joseph, discussed "Relation of Diet to Ophthalmology and Otolaryngology" before the Buchanan County Medical Society in St. Joseph, January 31.—Dr. Walter J. Siebert, St. Louis, discussed "Death and Revivescence with Experimental Human Studies" before the Kansas City Academy of Medicine, January 17.

Illegal Practitioner Sentenced.—Samuel Schmidtberger, operating the Medical Health Clinic in Kansas City, was recently sentenced to five years imprisonment and fined \$1,000 each on the eleven counts of the indictment which charged him with illegal narcotic sales. Schmidtberger had practiced about eleven years in Kansas City and in recent years had a licensed physician, the late Dr. Edward Lindsay Mize, as an assistant. Dr. Mize died during the Schmidtberger trial. According to a report from the United States Attorney in Kansas City, Schmidtberger has been in various kinds of trouble since about 1912 and has been a fugitive from justice from California since 1924. He was "driven out of Old Mexico," it is reported, where he had appeared as a doctor under the name "Samuel Schmidtberger." Official correspondence in regard to this case refers to him as a "dangerous charlatan posing as a doctor of medicine."

NEW JERSEY

Society News.—Dr. Joseph T. Beardwood Jr., Philadelphia, discussed "Newer Concepts of Diabetes Mellitus" before the Medical Society of Atlantic County in Atlantic City, February 13.—Dr. Richard A. Kern, Philadelphia, discussed "Clinical Allergy" before the Academy of Medicine of Northern New Jersey, February 19. Dr. Newell C. Gilbert, Chicago, discussed "Factors Influencing the Coronary Flow" before the society section on medicine and pediatrics, February 10.

Tuition Waived for Military Men in Course in Amputations.—The New York University College of Medicine, New York, announces that customary tuition for the postgraduate course in amputations will be waived in the case of qualified military and naval medical officers. The course will be given by Dr. Henry Howard Kessler, lieutenant commander, U. S. Naval Reserve, at the Newark City Hospital and the New Jersey Rehabilitation Clinic of Newark. The work will open on March 14 and continue through April 25. Additional information may be obtained from the dean of New York University College of Medicine, 477 First Avenue, New York.

NEW YORK

Health Officer Honored.—Dr. Samuel W. S. Toms, health officer of South Nyack, Rockland County, was guest of honor at a reception and dinner recently in Nyack, given by the Rockland County Medical Society in observance of his eightieth birthday and the completion last spring of fifty years in the practice of medicine. Dr. Toms graduated at the University of Buffalo School of Medicine in 1891. He served as health officer of South Nyack from 1899 to 1902 and again after 1930. He is the third member of the county medical society to have completed fifty years of practice and is one of the two remaining members of the first medical and surgical staff of the Nyack Hospital. Dr. Toms was presented with a scroll bearing a sketch of the bronze tablet which is to be erected in the hospital in his honor.

Graduate Lectures.—The state medical society and the state department of health recently cooperated in Watertown on a graduate course on sulfonamide therapy for the Jefferson County Medical Society. The speakers were:

Dr. Alexander D. Langmuir, Peekskill, Behavior of Sulfonamides in the Body and Principles for Their Use, January 27.
Dr. Leon E. Sutton, Syracuse, Local and Internal Use of Sulfonamides in Surgery, January 27.
Dr. Alister M. McLellan, New York, Treatment of Genitourinary Infections in the Male, February 12.
Dr. Edward C. Hughes, Syracuse, Sulfonamides in Obstetrics and Gynecology, February 12.
Dr. Clayton W. Greene, Buffalo, Treatment of Pneumonia, February 24.
Dr. Harry Bakwin, New York, Treatment of Meningitis, February 24.

One lecture was arranged for the annual staff meeting of the Mercy and Auburn City hospitals in Auburn, January 27. Dr.

Ralph Gregg of the U. S. Public Health Service, New York, discussed "Activities of the U. S. Public Health Service, with Special Reference to National Defense."

New York City

First Mary Swartz Rose Lecture.—Conrad A. Elvehjem, Ph.D., professor of agricultural chemistry, University of Wisconsin, Madison, delivered the first Mary Swartz Rose Memorial Lecture at the New York Academy of Medicine on February 3. His subject was "Natural Foods in the American Dietary." The lecture was sponsored by the Greater New York Dietetic Association in memory of the late Mary Swartz Rose, Ph.D., professor of nutrition at Teachers College, Columbia University, who died Feb. 1, 1941.

Society News.—Dr. Shields Warren, Boston, discussed "Tissue Changes Following Irradiation" before the New York Roentgen Society, December 15.—Dr. Edwin C. Hamblen, Durham, N. C., addressed the Medical Society of the County of Kings and the Academy of Medicine of Brooklyn recently on "Some Observations on the Diagnosis and Treatment of Functional Disorders of the Pituitary and Ovaries."—Dr. Frank H. Lahey, Boston, discussed "Newer Developments in Surgery" before the Medical Society of the County of Queens on January 27.

Symposium on Syphilis.—A symposium on syphilis and dermatology was held under the auspices of the Long Island College of Medicine, the Bureau of Social Hygiene and the Red Hook-Gowanus Health Center of the department of health, February 6. The speakers included:

- Dr. Moses Silverman, Cutaneous Manifestations of Syphilis.
- Dr. Lewis D. Stevenson, Neurosyphilis: Some Clinical and Pathological Aspects.
- Dr. Thurman B. Givan, Brooklyn, Interstitial Keratitis.
- Dr. Anthony C. Cipollaro, Use of Physical Therapy in Dermatology.
- Dr. Howard Fox, Diseases of the Skin Due to Animal Parasites.
- Dr. Marion B. Sulzberger, Eczema and Its Treatment.

New Director of Child Hygiene.—Dr. Leona Baumgartner has been appointed director of the bureau of child hygiene of the city department of health, having placed first on the list in the recent civil service examination. Dr. Baumgartner, who has been acting director of the bureau since Jan. 1, 1941, was born in Chicago and graduated at Yale University School of Medicine in 1934. She joined the health department in 1937 as medical instructor in child and school hygiene, and in 1938 was director of public health training. In 1939 Dr. Baumgartner passed a civil service examination for district health officer and was assigned to the Kips Bay-Yorkville Health and Teaching Center and in her capacity as health officer served as assistant professor in pediatrics and public health at Cornell University Medical College.

Dr. Oppenheimer Honored.—Dr. Bernard Sutro Oppenheimer, clinical professor of medicine at Columbia University College of Physicians and Surgeons, was presented with a volume of one hundred and six papers at a ceremony in Mount Sinai Hospital, February 10. The volume was compiled especially to honor Dr. Oppenheimer on his sixty-fifth birthday, which he observed June 20, 1941. The gift represents the contributions of one hundred and fifty-nine physicians and twenty-nine laymen, including Governor Herbert H. Lehman. Dr. Oppenheimer graduated at the College of Physicians and Surgeons of Columbia University in 1901. He served overseas in the World War and has the rank of colonel. He was in the medical reserve corps until 1934. According to a release from Mount Sinai Hospital, Dr. Oppenheimer has been associated there for thirty-seven years.

Eightieth Birthday of Dr. Max Einhorn.—The New York chapter of the National Gastroenterological Association held a special meeting on January 19 to mark the eightieth birthday of Dr. Max Einhorn, emeritus professor of medicine, New York Post-Graduate Medical School, Columbia University. The Rudolf Virchow Medical Society observed his birthday on January 5. Dr. Einhorn was given a testimonial dinner on January 10 by the staff of the Lenox Hill Hospital, with which he has been associated for more than fifty years. Dr. Einhorn was born in Grodno, Russia, on Jan. 10, 1862 and received his medical degree at the University of Berlin, where he studied from 1880 to 1884. He was affiliated with the New York Post-Graduate Medical School since 1896. He was chairman of the American Committee of the International Congress of Gastroenterology in 1935 and once served as president of the American Gastroenterological Association.

OHIO

Personal.—Dr. Addison L. Kefauver, Columbus, has been appointed acting supervisor of the medical section of the Ohio State Industrial Commission. Dr. Henry P. Worstell, Colum-

bus, who has gone on active duty in the navy medical corps, has been given an indefinite leave of absence as supervisor.—Dr. Isaac P. Seiler, Piketon, was recently reelected mayor.

Professor of Pediatrics at Cincinnati.—Dr. Alexander A. Weech, associate professor of pediatrics, Columbia University College of Physicians and Surgeons, New York, has been appointed professor of pediatrics at the University of Cincinnati College of Medicine, Cincinnati, to succeed the late Dr. Albert Graeme Mitchell. A native of Baltimore, Dr. Weech graduated at Johns Hopkins University School of Medicine in 1921, subsequently serving for some years on the faculty. From 1928 to 1930 he was in charge of the division of pediatrics at Peiping Union Medical College, Peking, China. He joined the staff of Columbia University College of Physicians and Surgeons as assistant professor of diseases of children, becoming associate professor in 1932.

Physicians Must Sign Fee Bill on Workmen's Compensation.—Effective on March 1 a fee bill for treatment rendered a claimant of the state industrial commission must be signed by the physician who renders the treatment or a physician who actually sees and examines the patient and directly supervises treatment, according to a resolution adopted by the commission on Dec. 19, 1941. The signature must be in the physician's handwriting and be duplicated underneath in legible printing or typewriting. The resolution, which was approved by the committee on workmen's compensation and the council of the Ohio State Medical Association, was formulated to give the industrial commission more authority with respect to curbing certain abuses, primarily the one whereby some physicians have been signing medical reports and presenting fee bills for services rendered by assistants under circumstances in which the services were not directly supervised by the physicians submitting the reports and fee bills, or in which, according to the state medical journal, the patient was not seen or examined at any time by such physician.

PENNSYLVANIA

Society News.—Dr. Jonathan E. Rhoads, Philadelphia, discussed "Use of Sulfonamides in Surgery" before the Lebanon County Medical Society in Lebanon, February 10.—Dr. Hans May, Philadelphia, addressed the Lycoming County Medical Society in Williamsport, February 13, on "Plastic and Reconstructive Surgery."—Dr. Sydney J. Hawley, Danville, discussed "Minor Uses of Roentgen Ray in Treatment" before the Montour County Medical Society in Danville, February 20.—Dr. Chester S. Keefer, Boston, addressed the Blair County Medical Society in Altoona, January 27, on "Treatment of Infectious Diseases Common in War Times."—The Cambria County Medical Society was addressed in Johnstown, February 12, by Dr. Harold W. Jones, Philadelphia, on "Transfusion of Blood Plasma and Other Blood Substitutes."

Philadelphia

Special Lectures at College of Physicians.—David Bruce Dill, Ph.D., director of the fatigue laboratory, Harvard University, Boston, and Dr. Arlie V. Bock, Henry K. Oliver professor of hygiene, Harvard University, Cambridge, Mass., will deliver the James M. Anders Lecture before the College of Physicians of Philadelphia, April 1. Their subject will be "Fatigue." René J. Dubos, Ph.D., of the Rockefeller Institute for Medical Research, New York, delivered a Mary Scott Newbold Lecture before the college, March 4, on "Origin, Nature and Properties of Gramicidin." Dr. Francis R. Packard, Philadelphia, gave a public lecture January 16 under the auspices of the college on "The Diagnosis of Diseases of the Lungs and Heart; Stethoscope to X-Ray." Clive M. McCay, Ph.D., professor of nutrition, Cornell University, Ithaca, N. Y., delivered the twenty-sixth Nathan Hatfield Lecture before the college, February 4. His subject was "Nutrition, Aging and Longevity."

VIRGINIA

Personal.—Dr. John Shelton Horsley, Richmond, has been appointed a member of the state hospital board for a term ending June 30, 1943. Dr. Robert Finley Gayle Jr., Richmond, whose term expired June 30, 1939, had been serving until a new appointment was made.

State Journal to Publish Laws.—One issue of *Virginia Medical Monthly* will be devoted to the publication of all laws pertaining to the practice of medicine in the state, in accordance with action of the council of the state medical society at its meeting on January 8 in Richmond. The idea emanated from the publication of the "Blue Book" of Wisconsin, published by the *Wisconsin Medical Journal*. A lawyer will be employed to correlate the material.

WASHINGTON

Physician Honored.—The Children's Orthopedic Hospital, Seattle, has dedicated its third floor as the "Sharples Surgical Division" in honor of Dr. Caspar W. Sharples, who has been affiliated with the hospital for thirty-four years. Dr. Sharples is consultant on the general surgery staff. A tablet and portrait at the entrance of the hospital are a tribute to his service.

Society News.—Reno Odlin, Tacoma, president of the Puget Sound National Bank, discussed "Our Economic Future" before the Pierce County Medical Society, Tacoma, February 10, and Dr. Charles P. Larson, Tacoma, "Forensic Medicine." Dr. Warren C. Hunter, Portland, discussed "A Clinical and Pathological Consideration of Thrombosis of the Deep Veins of the Leg and Pulmonary Embolism" at the February 24 meeting, and Dr. Harry B. Allison, Tacoma, presented a case report. Dr. Garnett Cheney, San Francisco, addressed a special meeting of the King County Medical Society recently on "Vitamin U and Peptic Ulcer."—Dr. Edward D. Hoedemaker, Seattle, addressed the Walla Walla Valley Medical Society in Walla Walla, January 8, on "The Psychologic Aspects of Injury in General and to the Head, and the Sequelae and Treatment."

WISCONSIN

State Heart Meeting.—At the recent annual meeting, the Wisconsin Heart Association adopted by-laws for the association and elected the following officers: Drs. Alvin G. Koehler, Oshkosh, president; Maurice A. F. Hardgrove, Milwaukee, vice president, and Raymond F. Wagner, Oshkosh, secretary-treasurer.

Personal.—Dr. Edward D. Hudson has been appointed health officer of Lake Geneva to succeed Dr. Lawrence H. Donath, who resigned to transfer his medical practice to Milwaukee.—Dr. Rogers E. Garrison, Wisconsin Rapids, has been appointed coroner of Wood County, filling the unexpired term of Dr. Patrick E. Wright, Wisconsin Rapids, who resigned after holding the position seven years.

Dr. Newberry Goes to Farm Security Administration.—Dr. Charles L. Newberry, Milwaukee, has been appointed senior medical officer in the medical service division of the Farm Security Administration, according to the *Milwaukee Medical Times*. He will be stationed at Upper Darby, Pa., and will have jurisdiction over rural areas in New England, New York, Pennsylvania, Delaware, Maryland and New Jersey. Dr. Newberry graduated at Marquette University School of Medicine, Milwaukee, in 1926.

WYOMING

Sixth Typhoid Carrier Found.—*Western Public Health* reports that the sixth typhoid carrier was found recently in Wyoming since a case finding program was started more than a year ago. The carrier was a nurse, the mother of three sons, all of whom have had the disease. She gave a history of having had typhoid in 1917.

Society News.—The Laramie County Medical Society devoted its meeting in Cheyenne, January 24, to a program on medical preparedness with the following speakers, among others: Dr. Roscoe H. Reeve, Casper, "Wyoming Physicians in the Defense Program"; Dr. Paul W. Emerson, Cheyenne, "Food Problems on the Home Front"; "Causes of Rejection in Wyoming Selectees," and Dr. John W. Ames, Denver, "Medical Problems in Defense Preparedness." Nels H. Smith, Cheyenne, governor of the state, and Ed Warren, Cheyenne, mayor of Cheyenne, gave the introduction.

GENERAL

Postgraduate Psychiatric Education.—The American Psychiatric Association will hold its fifth institute on postgraduate psychiatric education for state hospitals at the Missouri State Hospital, St. Joseph, March 23-April 4.

Bulletin on Infantile Paralysis Activities.—The National Foundation for Infantile Paralysis recently began the publication of the *National Foundation News*. The bulletin is to be the medium for the exchange of ideas on problems common to the chapters. It will also carry news of their various activities.

Regional Pediatric Meeting Postponed.—Because of existing conditions the 1942 meeting of region IV of the American Academy of Pediatrics has been postponed until the United States and our allies have won the war. It is planned that the first postwar meeting of region IV will be held in Los Angeles.

Assembly of Women's Field Army Abandoned.—Plans to hold a national assembly of the Women's Field Army in 1942 were canceled at a meeting of the board of directors of the American Society for the Control of Cancer in December. Instead, a series of local conferences will be held. The action was taken in view of the national emergency.

Wholesale Druggists' Association Indicted.—The U. S. Department of Justice announced on February 6 that a federal grand jury sitting at Newark, N. J., had returned an indictment charging the National Wholesale Druggists' Association, twenty-three of its members and twenty-nine officers and agents with conspiracy to violate the Sherman Act by fixing wholesalers' margins of profit on drug products. The National Wholesale Druggists' Association constitutes the largest group of drug wholesalers in the nation, doing about 80 per cent of the wholesale drug business in the United States. Twenty-three out of a total association membership of two hundred and eleven were indicted. Sixty-four of the two hundred and eleven wholesalers are branches of the defendant McKesson & Robbins, Inc. Those indicted handle a full line of drug products and provide various services in connection with sales to retail druggists.

Another Fraudulent Salesman.—A man giving his name as F. S. Antrim has been calling on physicians claiming to be a representative of the Intra Products Company of Denver. He has been accepting checks for orders payable to the Intra Products Company, endorsing and then cashing them. A letter from the Intra Products Company states that this man has never been in the employ of the company but mentions that he is said to be an ex-convict with a record in Salt Lake City, Denver and St. Louis. The company has been notified of his irregular activities in Illinois, Missouri and Indiana. A description received from one physician, who had been defrauded, states that "Antrim" is about 50 years old, about 5 feet 6 inches tall, with dark hair graying at the temples and weighing around 150 pounds. This physician intends to prosecute the man and urges any one learning of his whereabouts to notify the Missouri state police.

Change in Status of Licensure—Dr. Stammer Exonerated.—In *THE JOURNAL*, Oct. 12, 1940, page 1290, under "Changes in Status of Licensure" it was reported that the New York State Board of Medical Examiners on July 19 had suspended the license of Dr. Emanuel L. Stammer of Jamaica for one year. Sidney Paymer, counselor at law who represented Dr. Stammer, now states that Dr. Stammer was exonerated by the Appellate Division of the Supreme Court of the State of New York and also by a five to two decision of the Court of Appeals of the State of New York. Mr. Paymer writes that in the opinion of the Appellate Division there was no evidence of any fraud and deceit on the part of Dr. Stammer, nor in its opinion was there anything to justify a suspension of his license. This opinion was affirmed by the Court of Appeals, which also wrote an opinion stating that there was no fraud and deceit practiced by Dr. Stammer nor did he in any way violate the statutes of the state of New York.

Association for the Advancement of Science.—The nineteenth annual Thousand Dollar Prize of the American Association for the Advancement of Science was given to Dugald E. S. Brown, Ph.D., assistant professor of physiology, and Douglas A. Marsland, Ph.D., assistant professor of biology, New York University, New York, and Frank H. Johnson, Ph.D., instructor in biology, Princeton University, Princeton, N. J., for their joint papers on the following subjects: "The Reversible Denaturation of Enzymes as a Determining Factor in the Reaction of Biological Systems to Temperature and Pressure" and "Mechanism of Temperature and Hydrostatic Pressure Reversal of Narcosis in Luminous Bacteria." Dr. Brown received his Ph.D. degree at Cornell University in 1933. Dr. Marsland took his Ph.D. degree at New York University in 1934. Dr. Johnson received his Ph.D. at Princeton University in 1936 and his A.M. at Duke University in 1932. The award was presented during the recent annual meeting of the American Association for the Advancement of Science in Dallas.

LATIN AMERICA

Hospital News.—The Faculty of Medicine of the Catholic University of Chile, Santiago, recently opened a hospital with a capacity of two hundred beds. Eighteen physicians are on the staff.

Portuguese Language for Brazilian Press.—A law was recently promulgated making it mandatory for all journals and papers of Brazil to be written in Portuguese and forbidding the further publication in foreign languages. According to

Brasil-Medico, the law aims to enforce national unity and national defense. It was issued by President Getulio Vargas of Brazil through the National Council of the Press.

Argentine Chapter on Gastroenterology Formed.—According to the *Review of Gastroenterology*, an Argentine chapter of the National Gastroenterological Association has been organized. Dr. Carlos Bonorino Udaondo, honorary professor of the University of Buenos Aires and director of the National Institute for Diseases of the Digestive System of Buenos Aires, has been chosen the first president. Other officers include Dr. José Oviedo Bustos, gastroenterologist of the University of Rosario, vice president; Dr. Pedro A. Maissa, adjunct professor of radiology of the University of Buenos Aires, secretary, and Dr. Guillermo P. Gonalones, director of the experimental laboratory of the National Institute for Diseases of the Digestive System, treasurer.

CORRECTIONS

Francis Carter Wood.—In the medicolegal abstracts in *THE JOURNAL*, February 14, page 557, in the seventh line from the bottom, the name Dr. Francis Ward should have been Dr. Francis Carter Wood. The legal publication from which this abstract was made gave the name incorrectly.

Discussion on Surgical Approach to Hypertension.—Following the paper by de Takats, Heyer and Keeton in *THE JOURNAL*, February 14, page 501, is a discussion credited to Dr. Claude Beck of Cleveland. Dr. Beck writes that Dr. Peter Heinbecker of St. Louis wrote this discussion and in his absence Dr. Beck read it before the meeting.

Government Services

Changes in Division of Vital Statistics

Dr. John Collinson Jr., since 1935 assistant chief statistician for vital statistics, U. S. Bureau of the Census, has resigned to become deputy state health officer of Maryland. Dr. Collinson before joining the Bureau of the Census had been associated with the Maryland State Department of Health for nineteen years. Forrest E. Linder, Ph.D., has been appointed assistant chief statistician for vital statistics to succeed Dr. Collinson.

Dr. Badger Named Assistant Director of National Institute

Dr. Lucius F. Badger, surgeon, U. S. Public Health Service, Washington, D. C., has been assigned as assistant director of the National Institute of Health, Bethesda, Md. Dr. Badger graduated at the University of Minnesota Medical School, Minneapolis, in 1921. For a time after joining the U. S. Public Health Service he was director of the U. S. Leprosy Investigation Station at Honolulu, Hawaii, and has written a number of articles on leprosy, typhus, Rocky Mountain spotted fever and psittacosis.

Knopf Collection Given to Army Library

The medical library of the late Dr. Sigard Adolphus Knopf, New York, has been given to the Army Medical Library, Washington, D. C. In addition to this collection of more than twelve hundred books, the gift includes a compilation of about five hundred published writings of Dr. Knopf, which is to be kept in the archives of the army library, and a group of one thousand duplicates which will be available for loan and distribution. There are included also portraits of many medical men, letters of Osler and Welch and other famous physicians, and diplomas of various kinds. Other prized collections of Dr. Knopf have been distributed by Mrs. Knopf. A group of photographs of past presidents and vice presidents of the National Tuberculosis Association and letters has been given to the association. The material on three inventions, his instruments and many photographs and letters have been given to the New York Academy of Medicine for its medical museum. His office furniture was given to the Post-Graduate Medical School, where he was a member of the staff for many years, and to the Sea View Hospital for use by the physician in chief.

Foreign Letters

LONDON

(From Our Regular Correspondent)

Jan. 17, 1942

The Increase in Tuberculosis

As stated in a previous letter, although the general health of the population remains good and indeed the figures show some improvement on the prewar ones, a slight increase in tuberculosis has been observed. A similar increase occurred in the last great war. Curiously, the increase has been most noticeable in women between the ages of 15 and 25. The death rate per million from pulmonary tuberculosis in this group rose from 702 in 1939 to 881 in 1940, while the death rate at all ages rose from 535 to 587. More recent figures for the first quarter of 1941 show a slight improvement compared with the corresponding quarter of 1940. At the invitation of the minister of health, the Medical Research Council has arranged for an immediate inquiry into the cause of the increase. The minister is so concerned that he has already sent a circular to the local health authorities to take steps in the matter.

He points out that arrangements for the care and after-care of the tuberculous are an essential adjunct to the treatment service. The problem of sufficient beds for residential treatment has been a difficulty in some districts. If any authority is in need of more beds, the health officer should take up the matter with the principal regional medical officer. In many districts the difficulty is more in providing nurses than in accommodation. Steps have been taken to induce more women to train for tuberculosis nursing.

Precautions Against Louse Borne Typhus Fever

The existence of louse borne typhus fever in Europe and northern Africa has led the Ministry of Health to take precautions in case the disease reaches this country through refugees, prisoners of war or returning travelers. A memorandum on the disease has been issued to health officers and superintendents of isolation hospitals. The vaccine, made by using the yolk sac of the developing chick embryo as a medium, is available only for the teams engaged in combating the disease. Every case must be reported to the local health officer and by him at once to the Ministry of Health. The principal towns have been asked to organize teams of medical officers, nurses and sanitary inspectors and ambulance drivers for dealing with an outbreak. These will be provided with specially made protective clothing and offered preventive inoculation. Because of the difficulty of diagnosis, experts will be available for consultation. A mobile team, the Harvard Field Hospital now working in England, will also be available for assistance in diagnosis. On the admission of a patient to a hospital, precautions must be taken against any of the staff contracting the disease. The patient must be taken to a special bathroom, stripped, deloused and clad in hospital garments. This will involve cutting of the hair, shaving and thorough soaping all over.

Psychiatric Clinic at Guy's Hospital

There are plenty of psychiatrists in this country and not a few psychiatric clinics but none at our general teaching hospitals. Such things—even the word psychiatry—were unknown when even the most recent of our general hospitals were established, and we are by nature a conservative people. But at last the building has been completed of the first psychiatric clinic to be erected in this country as part of a general teaching hospital. This is called the York Clinic and has been erected at our most famous teaching hospital, Guy's Hospital. Its est-

ing has had to be deferred until the end of the war. Its completion at this time, when so much damage has been done to London and even to Guy's Hospital itself in the attempt of the new barbarism to subjugate and enslave Europe, is one more example of the calmness and confidence of our people, who, if possible, do not allow their normal activities to be interrupted by the war. But for fifty years Guy's had had a lecturer in psychologic medicine, and more than two hundred years ago the bookseller who founded it provided in his will for the care of 40 chronically insane patients in the ward of the hospital. Later the funds available for this purpose were transferred to Bethlem hospital, which is devoted to mental disease. Such places used to be called "lunatic asylums," a term which reflected the hopeless attitude then general as to mental illness. But the new clinic reflects the developments of psychiatric science which have since taken place. Functional mental disorders or psychoneuroses have been found to result from mental stress and to need and respond to early treatment.

The York Clinic is constructed for the treatment of psychoneuroses severe enough to require inpatient treatment and of psychoses. The purpose of having it within the precincts of a general hospital are to encourage early treatment and to facilitate teaching of psychologic medicine. The building contains forty-five beds and has five floors. In the basement are the laboratory, gymnasium and dining room. The roof is a recreation space. The building has been made as far as possible a place where patients can live without being confined to bed. Most of the accommodation is in single rooms, but there are some three bed dormitories.

Soldiers in Armor

As reported in a previous letter, an important discussion took place at the Section of Surgery of the Royal Society of Medicine on protection of the soldier in warfare (*THE JOURNAL*, Aug. 24, 1940, p. 626). The old objection to armor—overloading the soldier—no longer holds, for he often does not march but is carried by lorry, motorcycle or airplane. Moreover, steel of great tensile power, as well as other suitable materials, is now available. At the same meeting Sir Richard Cruise (ophthalmologist) described a duralumin vizor which he had devised for the protection of the eyes. Though leading surgeons have advocated armor for fighting men from time to time, they seemed to make no impression on the War Office. However, it is now reported in the press that the authorities are testing a new type of body armor for troops, made from a new light metal. The chest and abdomen plates weigh no more than 2 pounds. Picked soldiers are now being put through special field training to test the armor and find whether their movements and mobility are slowed. Firing tests have been carried out with rifle, tommy gun, machine gun and shrapnel splinters. The armor is said to be proof against revolver fire at little more than point blank range.

Are Synthetic Vitamins Satisfactory?

In a paper read before the Royal Institution, Prof. J. C. Drummond, scientific adviser to the Ministry of Food, discussed planned wartime nutrition, pointing out that during the last great war the nutrition of the population was not considered from the point of view of vitamin deficiency. During the latter part of the war there were in medical literature only a few scattered references to vitamins and guarded references to the importance of something which today is fully understood. By 1918 there was evidence of progressive deficiencies, which, had they been continued, would have had far reaching effects on the health of the nation. Of the great advances in nutrition made since that period he dealt particularly with the vitamin B group. Many parts of the skein had yet to be unraveled. It was by no means certain that yeast extract or

an extract of wheat germ, which was very rich in vitamin B, could be replaced, as far as the B complex was concerned, by the synthetic vitamin. Some factors had evidently not yet been identified. Hence the reluctance to depend on other than the natural foods. However well a mixture of synthetic vitamins was combined, there was always the fear that some essential factors, as yet unidentified, might be left out. It seemed therefore that the major problem of feeding the nation in wartime had to be solved, as far as possible, by providing natural food-stuffs. Just before the war, knowledge of nutrition advanced from the laboratory to clinical study. The League of Nations set up inquiries regarding nutrition in practically all the countries of the world, and much the same picture was presented everywhere. Among the peoples of western Europe there were clearcut food deficiencies, in nearly every case of the principal vitamins.

BUENOS AIRES

(From Our Regular Correspondent)

Jan. 25, 1942.

New Form of Dementia Paralytica

Dr. Gonzalo Bosch recently at the Academia Nacional de Medicina of Buenos Aires reported a case of atypical dementia paralytica of the Lissauer type observed in association with Dr. Braulio Moyano. It is generally accepted that in dementia paralytica of Lissauer's type the most acute lesions are those on the posterior regions of the brain, especially on the parieto-temporal regions, which are exhibited by clinical symptoms of aphasia or astereognosis. Frequently the patients suffer from epileptic attacks. The author's patient was an inmate of the psychiatric hospital of Las Mercedes in Buenos Aires. He was 32 years old and was observed by the speaker and his collaborator for more than four years. He presented for some time transient loss of memory and a condition of puerilism and mental distraction. Later on he exhibited acute dementia and frequently had epileptic attacks. The form of dementia paralytica in this case was apparently simple. Necropsy showed light diffuse atrophy of the cortex which was acute in the right orbital lobe. The lobular circunvolutions were rough, retracted and wrinkled. The left orbital lobe was apparently normal. Microscopic study of the involved tissues showed demolition of the cortical roof, which in some regions was so acute that even the vestiges of cellular architecture had disappeared. The few remaining cells in the involved region exhibited acute changes of a chronic type. The diagnosis of paralytic atrophy of the orbital lobe is uncertain, because of the fact that, up to now, the symptoms have been unknown.

The Endocrine Glands

Dr. B. A. Houssay, professor of physiology at the Academia Nacional de Medicina of Buenos Aires, recently read a paper on the relations between the thymus and other endocrine glands. The influence of the latter on the former is proved by (1) the existence of anatomic endocrine thymic correlations before and after birth, (2) the changes of the thymus following removal of an endocrine gland and the favorable modifications of the structure from administration of extracts of the given endocrine gland, (3) the results of transplantations of endocrine grafts, (4) the stimulation of the thymus by administration of extract of the anterior lobe of the hypophysis and (5) the results of anatomicoclinical studies. Removal of the thymus does not produce endocrine disorders in white rats. The effects of the endocrine glands on the thymus may be either direct or indirect (through another endocrine gland). The hypophysial corticoadrenotropic hormone produces involution of the thymus only if the adrenals exist. Probably certain thymic disorders are due to nutritional disturbances of endocrine origin. The

endocrine glands have moderate effects on the lymphatic glands, through the thymus. The structure has precise relations with the sex glands. The adrenals attenuate the functions of the thymus. Adrenalectomy in white rats results in development of hypertrophy of the thymus and of the lymphatic ganglions, which can be controlled by administration (injections) of hypophyseal corticoadrenal hormones or by the hypertrophy of the accessory adrenals. Corticoadrenal and hypophyseal corticoadrenotropic hormones administered produce involution of the thymus. The thyroid stimulates development of the thymus. Thyroidectomy results in early involution of the structure, whereas hyperthyroidism stimulates or revives development of the thymus and of the lymphatic structures. The hypophysis plays an important role in stimulating the thymus. Gonadotropic and corticoadrenotropic hormones cause involution of the thymus only when the gonads and adrenals respectively exist. The persistence or revival of the thymus is a frequent occurrence in acromegaly. Houssay said that several nutritional and endocrine factors are of the same importance in the development and functions of the thymus.

Public Health in Uruguay

The most important activity during 1940 was the reorganization of the health department and the drafting of a sanitary code. The training of a specialized staff has been extended to medical hygienists, visiting nurses and health officials.

Professor Linder of the U. S. Census Bureau spent six months in Uruguay to assist in the organization of the Vital Statistics Office, and, at the request of the ministry, prepared a vital statistics manual which is suitable for physicians and experts.

The epidemiologic reports were favorable; only a small focus of trichinosis has been discovered. Besides the regular health work may be mentioned extensive health education carried on in cooperation with the educational authorities, especially directed against tuberculosis, diphtheria and the use of maté in common, i. e., use of the same tube ("bombilla") by several persons for drinking maté, which is responsible for the spreading of infectious diseases. This habit is very common where maté is used. The construction of a number of hospitals has been begun and already two wings of a new psychiatric hospital of one thousand beds are completed.

Brief Reports

The council of the Faculty of Medicine of Buenos Aires elected a special commission of professors of the faculty to study the causes of the high infant mortality and also to determine why so many young men have been declared unfit for military service.

The National Academy of Medicine in Buenos Aires accepted several donations, one of 150,000 pesos (about \$40,000) for the installation and maintenance of a section of cardiology in the Instituto de Investigaciones Físicas aplicadas a la patología humana; also the amount necessary to create a section for the treatment of chronic bronchopulmonary disorders.

An outbreak of cerebrospinal meningitis has been observed in Santiago de Chile, with more than 280 cases and sixty-one deaths. The authorities have now declared that this epidemic has ended.

The convention of the Argentine rheumatism association concerned itself particularly with investigations on the efficacy of Argentine sulfur springs. It was suggested that the therapeutic waters of the American continent should be more thoroughly investigated. Then it was suggested that homes for convalescents from rheumatism be established outside the capital, where rest treatments of from three to five months could be carried out, which would be impossible in the hospitals.

The Asociación Médica Argentina has introduced annual conventions that are to be held outside Buenos Aires. The first meeting was held in December in the large Argentine spa Mar del Plata (on the Atlantic Ocean). These annual meetings are to establish closer contacts and better cooperation among the scientific workers of the different regions of the country. The first convention considered the moral and material crisis of the medical profession with its causes and the means to remedy it, activity of the central committee for measures against hydatidosis, the importance of sanatoriums located on the ocean, and the necessity of social welfare work. A meeting of the Surgical Society of Argentina was combined with this convention.

In both October sessions for general medicine, which were held by the Asociación Médica Argentina, the vitamins of the B₁ group and vitamin D were discussed.

In November a delegation of one hundred and sixty Brazilian physicians visited the faculty of medicine of Buenos Aires in reply to a visit of Argentine physicians to Rio de Janeiro and São Paulo. During the week spent in Buenos Aires numerous scientific sessions, inspections and receptions were held.

In November the English surgeon Sir Harold Delf Gillies lectured in Buenos Aires at the invitation of the faculty of medicine and of the Academia Nacional de Medicina. His lectures concerned chiefly plastic surgery during war.

The Brazilian parasitologist Prof. H. da Rocha Lima lectured in Buenos Aires during the second half of November.

To commemorate the fiftieth anniversary of the existence of the Patronato de la Infancia in Buenos Aires the second national conference for the protection of neglected and delinquent children will be held during September 1942; the medical and legal boards and scientific institutes concerned with these questions are all represented in the committee under the chairmanship of Dr. Gregorio Aráoz Alfaro.

The National Gastroenterological Association of the United States proposed the founding of an Argentine branch to be presided over by Prof. Carlos Bonorino Udaondo, director of the National Dispensary for Diseases of the Digestive Tract, in Buenos Aires.

The Institución Cultural Española in Buenos Aires created a laboratory for histologic and histopathologic investigations in memory of Prof. S. Ramón y Cajal, to be directed by Prof. Pío del Río Hortega of Buenos Aires, a disciple of Ramón y Cajal. The institute is to promote investigations on the histology of the nervous system, employing the technique of Cajal and his school. Eight investigators will be required.

Marriages

JOHN RUFUS McCracken to Miss Alma Estelle Kec, both of Waynesville, N. C., in Greenville, S. C., Dec. 20, 1941.

SPOTSWOOD DOUGLAS STODDARD, Savannah, Ga., to Miss Marjorie Hornbeak of Fort Pierce, Fla., in December 1941.

DANIEL FORNEY HOKE MURPHEY to Miss Martha Virginia Mann, both of St. Petersburg, Fla., Dec. 27, 1941.

EUGENE LIVINGSTONE VICKERY, Lena, Ill., to Miss Millie Margaret Cox at Sheridan, Ind., Dec. 21, 1941.

HARRY ALBERT ADAMS, Hanover, Pa., to Miss Mary Neal Hudson in Eufaula, Ala., in December 1941.

PAUL PENNINGTON HEARN, Greenville, S. C., to Miss Ida Irene Kemp in Atlanta, Ga., Dec. 26, 1941.

DURWOOD JAMES SMITH, New York, to Miss Sue Maxwell Mauldin in Charlotte, N. C., recently.

HUGH EDWARD HAILEY to Miss Claire Ridley Hummcutt, both of Atlanta, Ga., Dec. 10, 1941.

JAMES E. SHULL, Erwin, Tenn., to Miss Margaret Tucker of Kingsport, January 1.

Deaths

John Garfield Frost @ Chicago; Northwestern University Medical School, Chicago, 1907; clinical professor of surgery at Loyola University School of Medicine; fellow of the American College of Surgeons; past president of the American Association of Railway Surgeons; served during the World War; surgeon, St. Bernard's Hospital; associate surgeon, Illinois Central Hospital; chief surgeon for the Chicago and Eastern Illinois Railroad, Chicago and Western Indiana Railroad and the Belt Railway Company; aged 59; died, January 2, in Mercy Hospital of hypertensive heart disease and cerebral hemorrhage.

Joseph Emmons Briggs, North Dighton, Mass.; Boston University School of Medicine, 1890; member of the Massachusetts Medical Society; professor emeritus of surgery at his alma mater; fellow of the American College of Surgeons; consulting surgeon, Massachusetts Memorial Hospitals, Boston, Wesson Memorial Hospital, Springfield, Whidden Memorial Hospital, Everett, Leonard Morse Hospital, Natick, and Morton Hospital, Taunton; trustee of the Boston University; aged 72; died, January 4, in St. Petersburg, Fla.

William Lent Sneed, New York; Vanderbilt University School of Medicine, Nashville, Tenn., 1910; member of the Medical Society of the State of New York; fellow of the American College of Surgeons; consulting orthopedic surgeon, Nassau Hospital, Mineola, N. Y., North Country Community Hospital, Glen Cove, French Hospital and Hospital for Ruptured and Crippled, New York, and the Meadow Brook Hospital, Hempstead, N. Y.; aged 60; died, Dec. 7, 1941, of coronary sclerosis.

William Baker Gibson, Huntington, N. Y.; University of Vermont College of Medicine, Burlington, 1876; McGill University Faculty of Medicine, Montreal, Que., Canada, 1878; president of the Queens-Nassau Medical Society in 1900; at one time county coroner; instructor in materia medica from 1886 to 1888 and instructor in obstetrics and gynecology, 1888-1889 at the University of Vermont College of Medicine, Burlington; aged 85; died, Dec. 30, 1941, of diabetes mellitus.

Stephen Benedict Haessly @ Faribault, Minn.; College of Physicians and Surgeons of Chicago, School of Medicine of the University of Illinois, 1904; second vice president of the Minnesota State Medical Association; served during the World War; member of the board of sanatorium commissioners of the Mineral Springs Sanatorium, Cannon Falls; aged 66; died, January 11, in St. Mary's Hospital, Rochester, Minn., of periarthritis nodosa and infarcts of the brain.

Frank Smith Hale, Providence, R. I.; Tufts College Medical School, Boston, 1916; member of the Rhode Island Medical Society and the New England Obstetrical and Gynecological Society; fellow of the American College of Surgeons; served during the World War; aged 51; associate, Homeopathic and Miriam hospitals, Providence, Notre Dame Hospital, Central Falls, and consultant, St. Joseph's Hospital, where he died, January 12, of coronary thrombosis.

Vincent Tapp Churchman, Charleston, W. Va.; Jefferson Medical College of Philadelphia, 1889; member and past president of the West Virginia State Medical Association; past president and secretary of the Kanawha County Medical Society; fellow of the American College of Surgeons; member of the staff of the Kanawha Valley, Mountain State and St. Francis hospitals; aged 74; died, Dec. 21, 1941, of angina pectoris.

Edward Adams Shumway @ Philadelphia; University of Pennsylvania Department of Medicine, Philadelphia, 1894; member of the American Ophthalmological Society; formerly assistant professor of ophthalmology at his alma mater; aged 71; at various times on the staffs of the University Hospital, Children's Hospital, American Oncologic Hospital and the Lankenau Hospital, where he died, Dec. 19, 1941.

Jacob Schwinn @ Wheeling, W. Va.; Universität Bern Medizinische Fakultät, Switzerland, 1883; an Affiliate Fellow of the American Medical Association; fellow of the American College of Surgeons; past president of the Ohio County Medical Society; member of the staff of the Ohio Valley General Hospital and the Wheeling Hospital; aged 87; died, Dec. 26, 1941, of cerebral thrombosis.

Harry L. Myers @ Norfolk, Va.; University of Virginia Department of Medicine, Charlottesville, 1889; past president of the Norfolk County Medical Society; member of the American Laryngological, Rhinological and Otolological Society; fellow of

the American College of Surgeons; on the staff of the Hospital of St. Vincent de Paul; aged 72; died, January 5, in the Norfolk General Hospital.

Charles Sumner Christie @ Attleboro, Mass.; Medical School of Maine, Portland, 1898; member and past president of the Kent County (R. I.) Medical Society and the Rhode Island Medical Society; at one time chairman of the West Warwick (R. I.) school committee; served during the World War; aged 69; died, Dec. 18, 1941, in Seekonk, of coronary thrombosis.

Leonidas Blagdon, Montreal, Que., Canada; Laval University Faculty of Medicine, Quebec, Que., Canada, 1908; surgeon at the Hôpital Laval in France during the World War; was at one time professor of surgery and clinical surgery at the University of Montreal Faculty of Medicine; aged 56; on the staff of the Hôpital Notre Dame, where he died, January 1.

Albert Elmer Austin, Old Greenwich, Conn.; Jefferson Medical College of Philadelphia, 1905; member of the Connecticut State Medical Society; fellow of the American College of Physicians; served during the World War; formerly Congressman; for many years health officer of Greenwich; aged 64; died, January 26, of carcinoma of the lung.

Stephen Dolphard Brazeau @ Spokane, Wash.; University of Michigan Department of Medicine and Surgery, Ann Arbor, 1904; member of the Pacific Coast Oto-Ophthalmological Society; aged 66; died, January 1, in the Sacred Heart Hospital of acute nephritis.

William Alexander McKee, Chicago; University of Toronto Faculty of Medicine, Toronto, Ont., Canada, 1926; member of the Illinois State Medical Society; director of the psychiatric department of the Juvenile Court; aged 42; died, January 3, in the Passavant Memorial Hospital of hypertension and chronic nephritis.

Harry Milton Freeburg, Watertown, S. D.; University of Minnesota College of Medicine and Surgery, Minneapolis, 1904; member of the South Dakota State Medical Association; chief of staff of the Luther Hospital; aged 65; died, January 4, in Tama, Iowa, of coronary thrombosis.

Frank Clinton Walch, Clintonville, Wis.; Wisconsin College of Physicians and Surgeons, Milwaukee, 1909; aged 57; died, Dec. 9, 1941, in the Veterans Administration Facility, Milwaukee, of cerebral hemorrhage, nephrosclerosis, hypertensive heart disease and arteriosclerosis.

John Blassingame Johnston, St. George, S. C.; University of the South Medical Department, Sewanee, Tenn., 1899; member of the South Carolina Medical Association; aged 62; for many years secretary of the Dorchester County Medical Society; aged 62; died, Dec. 25, 1941.

Leighton Carling Conn, Edmonton, Alta., Canada; McGill University Faculty of Medicine, Montreal, Que., 1909; professor of obstetrics and gynecology at the University of Alberta Faculty of Medicine; fellow of the American College of Surgeons; aged 55; died, Dec. 22, 1941.

Clement Nelson Clark @ Canton, Ohio; University of Wooster Medical Department, Cleveland, 1904; past president of the Stark County Medical Society; member of the medical examining board during World War I; aged 67; died, Dec. 31, 1941, of coronary thrombosis.

Harold John Hammond, Detroit; Detroit College of Medicine and Surgery, 1927; served during the World War; on the staff of the Woman's Hospital; aged 43; died, Dec. 20, 1941, in the Veterans Administration Facility, Dearborn, Mich., of ulcer of the duodenum.

Michael Ryan Barrett, Cincinnati; University of Cincinnati College of Medicine, 1935; member of the Ohio State Medical Association; psychiatrist for the county probate court; aged 34; died, Dec. 30, 1941, in the Holmes Hospital of a streptococcal meningitis.

William Henry Dyer, Warwick Neck, R. I.; Medical School of Maine, Portland, 1894; served during the World War; past president of the Kent County Medical Society; formerly superintendent of health in the city of Warwick; aged 72; died, January 2.

Isadore Seff, New York; Columbia University College of Physicians and Surgeons, New York, 1902; fellow of the American College of Surgeons; associate attending surgeon at Beth Israel Hospital; aged 62; died, Dec. 20, 1941, of coronary thrombosis.

George Walrath ♂ Staten Island, N. Y.; Albany Medical College, 1905; past president of the Richmond County Medical Society; for many years on the staff of St. Vincent's Hospital; aged 61; died, Dec. 21, 1941, of arteriosclerosis and nephritis.

James Wesley Clark, Santa Rosa, Calif.; Cooper Medical College, San Francisco, 1893; formerly member of the school board; surgeon examiner for the local draft board during the World War; aged 77; died, Dec. 16, 1941, of cerebral hemorrhage.

George Theodore Weber ♂ Olney, Ill.; Missouri Medical College, St. Louis, 1894; fellow of the American College of Surgeons; medical director and superintendent of the Olney Sanitarium; aged 73; died, Dec. 26, 1941, of coronary thrombosis.

Michael Albert Dowler, Glen Dale, W. Va.; University of Wooster Medical Department, Cleveland, 1879; member of the West Virginia State Medical Association; formerly county sheriff; aged 89; died, Dec. 23, 1941, of chronic nephritis.

Charles Myron Rexford, Watertown, N. Y.; University of the City of New York Medical Department, 1881; aged 86; died, Dec. 2, 1941, in the House of the Good Samaritan of chronic hypertensive heart disease and arteriosclerosis.

Howard F. Palm, Camden, N. J.; Jefferson Medical College of Philadelphia, 1881; member of the Medical Society of New Jersey; past president of the Camden County Medical Society; aged 86; died, January 2, of pneumonia.

William Laughlin Grace, Plaquemine, La.; Medical Department of Tulane University of Louisiana, New Orleans, 1894; member of the Louisiana State Medical Society; aged 74; died, January 12, of carcinoma of the lung.

Charles Henry Ball, Tiffin, Ohio; Baltimore University School of Medicine, 1900; served during the World War; aged 70; died, Dec. 30, 1941, in the Veterans Administration Facility, Chillicothe, of cerebral arteriosclerosis.

Stanley Ross Burlage, Bedford, Ohio; Western Reserve University School of Medicine, Cleveland, 1927; member of the Ohio State Medical Association; aged 50; was found dead, Dec. 30, 1941, of a self-inflicted bullet wound.

Glenn Kennedy Dennis, Wilmington, Ohio; Miami Medical College, Cincinnati, 1904; member of the Ohio State Medical Association; served during the World War; aged 62; died, Dec. 18, 1941, of coronary thrombosis.

Frederick Jackson La Riew, Washington, N. J.; Baltimore Medical College, 1898; aged 74; died, January 6, in the Easton (Pa.) Hospital of arteriosclerosis and coronary occlusion.

William Brown Hyde ♂ Bakersfield, Vt.; Kentucky School of Medicine, Louisville, 1894; superintendent of schools from 1895 to 1907; for many years health officer; aged 75; died, Dec. 29, 1941, of coronary thrombosis.

Oscar T. Hines, Huntington, W. Va. (licensed in West Virginia in 1902); veteran of the Spanish-American War; on the staff of St. Mary's Hospital; aged 67; died, January 1, of pneumonia and chronic myocarditis.

J. B. Bagley, Waresboro, Ga.; Atlanta Medical College, 1894; member of the Medical Association of Georgia; at one time county coroner; aged 75; died in Waycross, Dec. 30, 1941, of myocarditis and nephritis.

Frederick William Brown, Franklin, Pa.; University of Michigan Department of Medicine and Surgery, Ann Arbor, 1899; member of the school board; formerly mayor of Franklin; aged 68; died, Dec. 21, 1941.

Henry Arthur Cassebeer, New York; Columbia University College of Physicians and Surgeons, New York, 1900; served during the World War; aged 67; died, Dec. 29, 1941, of acute dilatation of the heart.

Jacob G. Fisher ♂ Danville, Ill.; Rush Medical College, Chicago, 1901; aged 66; on the staffs of the St. Elizabeth Hospital and the Lake View Hospital, where he died, Dec. 24, 1941, of coronary thrombosis.

John Francis Maguire, Boston; Harvard Medical School, Boston, 1908; served during the World War; aged 66; died, Dec. 27, 1941, in the Veterans Administration Facility, Rutland, of cerebral hemorrhage.

William Richardson, Athens, Texas; Kentucky School of Medicine, Louisville, 1892; aged 75; died, Dec. 30, 1941, in the Nan Travis Memorial Hospital, Jacksonville of chronic nephritis and myocarditis.

Allyn King Foster Jr. ♂ New York; Rush Medical College, Chicago, 1930; assistant attending on the surgical staff of the Downtown Hospital; aged 36; died, January 17, in the Bellevue Hospital.

Thomas Dillon Hollingsworth, Akron, Ohio; Eclectic Medical Institute, Cincinnati, 1893; member of the Ohio State Medical Association; aged 73; died, January 6, of carcinoma of the sigmoid colon.

Joseph John Gomes ♂ Oakland, Calif.; College of Medical Evangelists, Los Angeles, 1923; aged 60; died, January 7, in the Peralta Hospital of coronary occlusion, hypertension and diabetes mellitus.

Guy Forrest Via, Forest Grove, Ore.; University of Oregon Medical School, Portland, 1909; aged 61; died, Dec. 7, 1941, in the Portland (Ore.) Sanitarium and Hospital of intestinal obstruction.

David A. Lane, Washington, D. C.; Howard University College of Medicine, Washington, 1894; veteran of the Spanish-American War; aged 82; died, Dec. 15, 1941, of bronchopneumonia.

Samuel Bryan Smith, Merchantville, N. J.; Hahnemann Medical College and Hospital of Philadelphia, 1888; aged 87; died, Dec. 20, 1941, of cerebral thrombosis and hypostatic pneumonia.

Charles C. Hankins, Springfield, Mo.; American Medical College, St. Louis, 1884; at one time mayor of Golden City; aged 81; died, Dec. 14, 1941, of arteriosclerosis and chronic nephritis.

Marshall D. Gray, Shushan, N. Y.; New York Homeopathic Medical College and Hospital, New York, 1895; aged 71; died, January 13, of chronic emphysema and acute myocarditis.

Emma Scott, Westerville, Ohio; Woman's Medical College of Cincinnati, 1893; for many years a medical missionary in India; aged 75; died, Dec. 17, 1941, of gastrointestinal malignancy.

Edgar H. Ford, Knoxville, Tenn.; Tennessee Medical College, Knoxville, 1903; member of the Tennessee State Medical Association; aged 62; died, Dec. 23, 1941, of cerebral hemorrhage.

Charles Wilbur Hull, Farmer City, Ill.; Dearborn Medical College, Chicago, 1906; member of the Illinois State Medical Society; aged 74; died, January 9, of acute dilatation of the heart.

John Alexander Koler, Los Angeles; Medical Department of Rocky Mountain University, Denver, 1897; aged 72; died, Nov. 16, 1941, of acute gangrenous cholecystitis.

Augustus Monroe Jones, Enid, Okla.; Missouri Medical College, St. Louis, 1882; aged 85; died, Dec. 25, 1941, in the Independence Hospital of arteriosclerosis.

Julius Eugene Salsbury, St. Petersburg, Fla.; Eclectic Medical Institute, Cincinnati, 1883; aged 86; died, Dec. 30, 1941, of cerebral hemorrhage.

Thomas Sargent Bailey, Newnan, Ga.; Atlanta College of Physicians and Surgeons, 1902; aged 66; died, Dec. 13, 1941, of coronary occlusion.

Grace Allen Graves, Chicago; Bennett College of Eclectic Medicine and Surgery, Chicago, 1901; aged 74; died, January 26, of chronic myocarditis.

Richard Vincent Barta, Park City, Utah; Denver and Gross College of Medicine, 1905; aged 67; died, January 1, following a pulmonary hemorrhage.

Alvin Adam Koch, Providence, R. I.; Jefferson Medical College of Philadelphia, 1896; aged 70; died, Dec. 26, 1941, of coronary thrombosis.

Joseph Franklin Hall, Kirkwood, Ill.; Hospital College of Medicine, Louisville, Ky., 1907; aged 60; died, January 5, of coronary thrombosis.

Stuart Elliott Nolan, Los Angeles; Tulane University of Louisiana School of Medicine, New Orleans, 1927; aged 49; died, Nov. 14, 1941.

Daikichi Matsuzawa, Long Island City, N. Y.; Northwestern University Medical School, Chicago, 1935; aged 36; died, January 1.

Arthur N. Brown, Richland, Texas; Missouri Medical College, St. Louis, 1887; aged 81; died in December 1941 of diabetes mellitus.

A. K. Gilbert, Clayton, Ind.; Medical College of Ohio, Cincinnati, 1877; aged 90; died, January 16, of arteriosclerosis.

Bureau of Investigation

NEW NAMES FOR OLD SWINDLES

Collecting Fraud Orders as a Hobby

Fraud orders issued by the United States Post Office are really effective—as far as the trade styles and names used at the time of the order are concerned. Circumvention therefore requires the use of new trade styles and names—but this fortunately results in the issuance of supplemental orders by the Post Office Department as indicated in the following paragraphs.

Cable Products and Oralene, Inc.—From New York one Eugene Cable, operating under a number of "Cable" firm names, put out "Pyro" under what the Post Office declared to be false and fraudulent representations and promises. These were to the effect that when used as directed it would quickly overcome, correct and remove the cause of pyorrhea, trench mouth and bleeding gums and prevent loss of teeth and that all users might expect results similar to those reported in alleged testimonials published in the sales literature. At the hearing of this case a government chemist testified that his analysis of Pyro had shown it to be an aqueous solution consisting of 1.45 Gm of sodium hypochlorite per hundred cubic centimeters. He added that special tests to determine the presence or absence of chlorothymol and oil of peppermint had not revealed these substances. Expert medical and dental witnesses testified for the government that pyorrhea and bleeding gums may be due to numerous local and systemic conditions and that although sodium hypochlorite might have some action on them its use in the form of Pyro would be ineffective because this product when taken into the mouth would lose its antiseptic properties before coming in contact with all of the microorganisms which, in pyorrhea, are found deep within the gums as well as on the surface. Much additional evidence was presented by the experts to show the worthlessness of Pyro and on May 14, 1941 the Post Office issued a fraud order against the names Cable Products, C B Cable Products, F I Cable Products, D N Cable Products and D L Cable Products. Some time thereafter the Post Office obtained evidence that Eugene Cable was continuing his mail order scheme and using a new trade style, Oralene, Inc. Also he was notifying former customers of Cable Products that "due to certain legal technicalities it was advisable to dissolve Cable Products and organize a new corporation." This evasion of the original fraud order was so transparent that on Oct. 23, 1941 the Post Office issued a supplementary one covering the name Oralene, Inc.

Emile Carpentier—In THE JOURNAL, Sept. 2, 1933, page 795, appeared a discussion of the fraud order that the Post Office Department had issued on April 25 of that year against Emile Carpentier of Hilldale, N. J., for using the mails to promote his quack "consumption cure" variously known as "Carpentier's T. B. Compound" and "Dr. Emile Carpentier's Compound of Oriental Herbs and Naturopathic Nonsurgical Treatment." The article showed that government chemists had reported the product to be essentially a mixture of animal fat with honey and ginseng root, which according to expert medical testimony could not cure or even mitigate any form of tuberculosis, that Carpentier is not a physician and presumptuously used "Dr." before his name and "N. D." after it on the basis of a "certificate of membership" that he had purchased for \$15 in 1932 from the "American Naturopathic Association" without even taking a course of study, and that in October 1929 he had been convicted of violating the Medical Practice Act of New Jersey and fined \$200. Carpentier attempted to evade the fraud order of April 1933 by having the business continued under his wife's name and accordingly in March 1940 the Post Office ordered him to show cause why a supplemental fraud order should not be issued against him and his wife. His defense consisted chiefly of testimonials alleged to have come from persons who had taken his "treatment." The government produced evidence that Carpentier had been advertising in newspapers "Tuberculosis is now CURED with Lungs Clear in about 6 months by Dr. Emile Carpentier, N. D. Lung Specialist with his T. B. Compound of Oriental Herbs and Naturopathic Treatment" with "without diagnosing, Surgery or Segregation." (Treating tuberculosis "without segregation" is of course not in the interests of the public health—treating it "without diagnosing" it is, however, quackery in the nth degree even when it is frankly stated, as in this case.) The government further showed that the advertisements directed "address all mail to Mrs. E. Carpentier" and that on receipt of replies Carpentier addressed personal letters to the inquirers. These activities were held to constitute a violation of the fraud order of 1933 and accordingly the Post Office on May 28, 1940 issued a supplementary fraud order to cover the names Mrs. F. Carpentier, Mrs. Emile Carpentier, Emile Carpentier, Discoverer, Mr. and Mrs. Carpentier, M. Carpentier, Mrs. M. Carpentier and Thomas F. Carpentier. Meantime, in February 1938 another government agency, the Federal Trade Commission, had issued Cease and Desist Order No. 3073, prohibiting Emile Carpentier from further representing that his "T. B. Compound" possesses curative or healing value in tuberculosis of the lungs, bronchitis, intestines, kidneys, brain or any other part of the body or in chronic bronchitis, colitis or chronic gastritis, that the product contains any oriental herbs or that physicians have prescribed it or have sent tuberculous patients in a critical or incurable condition to Carpentier. It is presumed that sooner or later Carpentier will "catch on" to what these governmental agencies have in mind in regard to his stuff.

Executive Sales Corporation—In February 1938 the Post Office Department notified Landon and Warner, Inc., of Chicago. George Landon, president, and Michael M. Warner, secretary-treasurer, to show cause why they should not be deprived of the use of the mails for using that service to sell their "Director Belt" under false and fraudulent representations and promises. Thereupon these defendants filed an affidavit with the Post Office, promising to cease selling their belt through the mails. The government, however, developed evidence that instead the concern simply gave the belt a new designation, "Executive," adopted a different trade style, Executive Sales Corporation, and continued to sell the device through the mails and to recommend it to obese persons to relieve strain on the heart, lungs and digestive organs, and overcome indigestion, high blood pressure, backaches and some other disorders. Again the Post Office ordered the concern (under its new name) to show cause why a fraud order should not be issued against it. At the hearing of the case the defendants presented several lay witnesses and two osteopaths, the latter testifying that the belt was valuable in treating obesity and relieving the other conditions mentioned. On the contrary, however, expert medical witnesses for the government testified that the belt would not cure obesity or lessen the strain that this disorder produces on the various organs of the body and that these conditions can be corrected only by treatment adapted to each particular case after careful diagnosis. The sale of this device therefore was declared to be a scheme for obtaining money fraudulently, and on Sept. 4, 1940 the mails were closed to the Executive Sales Corporation and its officers and agents. Another government agency, the Federal Trade Commission, also had taken action against the concern when it was operating under its original name. On Dec. 12, 1936, the Commission reported that it had ordered George Landon and M. M. Warner, trading as Landon and Warner, Chicago, to cease advertising that their "Director Belt" was a safe and efficacious method of treating abdominal obesity, would cure constipation, eliminate bloating after meals or make the wearer feel younger. Maybe they could sell the belt for holding up trousers without so much governmental interference.

H. J. Smith, Novelty Rubber Company, Atex Novelty Company and Atex Rubber Company—These are some of the names under which a concern at Hamilton, Ontario, has variously done business for years, selling through the mails what the Post Office Department has described as "certain obscene pictures and contraceptives." According to that department a fraud order was issued as long ago as April 29, 1931 against H. J. Smith and the Novelty Rubber Company. Later it was discovered that the fraudulent scheme was being continued and it was necessary to extend the fraud order on eight occasions as follows: Nov. 11, 1931 to cover the name S. S. Frank at Hamilton, Ontario, Feb. 1, 1932 to cover the name I. S. Frank at Buffalo, N. Y., March 8, 1932 to cover the name H. Smith at 11 Chatham Street, Hamilton, April 11, 1932 to cover the names H. Smith, Mr. Smith and P. O. Box 91, Hamilton, Aug. 7, 1936 to cover the N. Mfg. Co. Novelty Rubber Mfg. Co., H. Smith, Manager, Mr. H. Smith, H. Smith and Box 353 and their officers and agents at Hamilton, Feb. 27, 1939 to cover the names Atex Rubber Company, M. O. Drug Company, Box 231 and their officers and agents at Hamilton; and Jan. 10, 1940 to cover the name Atex Co. and its officers and agents at Hamilton, and on Jan. 10, 1941, to cover the name Dept. R, Manager, at Hamilton. Some time thereafter the Post Office found evidence that the scheme covered by these various fraud orders was still being conducted, now under the names Atex Novelty Company and Atex Rubber Company at Hamilton, and on July 11, 1941 a new fraud order was issued to cover these names.

Kayseemo Company—In this department of THE JOURNAL Oct. 7, 1939, page 1429, the fraudulent activities of one Lyle Carver of Kansas City, Mo., were discussed at some length. The article brought out that Carver had for years promoted quack "cures" for goiter, epilepsy, diabetes, kidney and bladder disorders and sexual debility in men and women and had operated under such names as "Oritone Laboratories," "Oriental Laboratories" and "Lyell H. Carver & Co." In fact, this exposé showed that still earlier (Jan. 15, 1927) the Post Office had issued a fraud order against Carver's "Oritone Laboratories" and had again barred Carver from the use of the mails on Sept. 24, 1938, on the ground that his "Thyogland Treatment" for goiter constituted another fraud. Carver characteristically flouted this fraud order of 1938 and continued to promote his Thyogland fakery through the mails by adopting a new trade style, the Kayseemo Company. When the Post Office discovered this trickery it issued a supplemental order on Feb. 23, 1940 to cover this new name. As THE JOURNAL stated in its previous article, "It now remains to be seen whether Carver will again pop up in the field of mail order quackery operating under a new trade style and exploiting a new 'cure'." Some devotees of quackery apparently do not place any significance whatever on the issuance of Post Office fraud orders.

Sorko, Lozinska, Sorokowski—and "Mizar"—At different times this department of THE JOURNAL has discussed Mizar, which for years was promoted as an alleged remedy for rheumatism. The first discussion appeared in THE JOURNAL as long ago as July 18, 1925, page 212. It was there shown that the product had at first been put out from Chicago but that its promoter, a J. Sorokowski, had moved his business to Oak Park, a suburb. The article mentioned three cases in which physicians reported that users of Mizar had come to them exhibiting various forms of dermatitis following applications of the "remedy." The article also brought out that the American Medical Association's chemists had reported that Mizar was an ointment whose chief active ingredient was essentially an extract of capsicum in a base of petrolatum, so—a horrible fit

and water. Eventually, as related in *THE JOURNAL*, Oct. 19, 1929, page 1240, the Post Office Department caught up with Sorokowski and debarred him from the use of the mails, having proved to its satisfaction that his scheme of selling through the mails Mizar, "Logos" (for menstrual disorders) and "Zdrojanka" ("an unequalled remedy for headache and hair strengthening") constituted a fraud. The fraud order was issued against the names Joseph Sorokowski, Z. Joseph Sorokowski, Jozef Sorokowski and J. Sorokowski. According to the Post Office memorandum on this case, Sorokowski volunteered the information that Mizar was a mixture of vaseline, marrow from horse and lamb bones and "a certain root of a plant," which apparently he was unwilling to admit was red pepper. He testified that his Logos for amenorrhea and "loss of manly strength" contained "the genital glands of the beaver." Government chemists had found that it contained 82 per cent of alcohol with other volatile matter aggregating 93.5 per cent. The memorandum also brought out that Sorokowski was a carpenter by trade and had had no medical training or experience. As it was discovered that Sorokowski, in spite of the fraud order, was continuing business and had added a new firm name, "Mizar," the Post Office Department on Aug. 27, 1931 extended the original fraud order to cover this new trade style. A further fraud order was issued March 31, 1932 against the name Mizar Company. Still the business continued, and on Oct. 10, 1938 Chryzostom Lozinski of Chicago was notified by the Post Office to show cause why a fraud order should not be issued against him on the ground that he was selling Mizar through the mails and was obtaining it from Joseph Sorokowski of Oak Park. Lozinski offered to file an affidavit agreeing to discontinue the business. This was accepted and the case closed. Later it was discovered that Marta Lozinska, wife of Chryzostom, was accepting orders and payments for Mizar through the mails at the same address as her husband had used and also that one A. D. Sorokowski, likewise connected with the business, was using the Oak Park address of Joseph Sorokowski and that he was supplying the product to the Sorko Medicine Company and Marta Lozinska as well as cashing the money orders that customers sent them. Government chemists found Mizar now to be a mixture of volatile oils including those of wintergreen, camphor and cineol in a base of petrolatum, beeswax and saponifiable fat, chiefly croton oil. In April 1941 the Post Office ordered the Sorko Medicine Company and Marta Lozinska of Chicago and A. D. Sorokowski of Oak Park to show cause why a fraud order should not be issued against them for perpetuating the Mizar business. Their attorney replied to the Post Office that they were willing to sign an affidavit promising to discontinue the enterprise. Because of the reputation of this business the offer was refused. Neither the respondents nor their attorney appeared at the hearing of the case, but a chemist and a qualified medical expert presented their testimony for the government and on June 13, 1941 a fraud order was issued against the three new names under which the Mizar business had been operating, Sorko Medicine Company, Marta Lozinska and A. D. Sorokowski.

The D. H. Brown Fraud.—D. H. Brown, M.D., is a Negro quack who has promoted a fraudulent "consumption cure" variously from Jacksonville and St. Augustine, Fla., under such names as "Dr. Brown's Magnolia Remedy," "Dr. Brown's New Consumption Remedy," "Creoco" and perhaps some others. No fewer than four fraud orders have been issued against Brown under his own name or other trade styles, such as Magnolia Remedy Company, Creoco Remedy Company, Rudolph Brown and Pauline Brown. The latter was said to be the maiden name of his daughter, who is reported to be married and living in New York. As long ago as 1917 Brown was prosecuted under the Pure Food and Drugs Act for making fraudulent claims in connection with his nostrum and fined a trivial \$50 and costs in a federal court. The case was reported Feb. 22, 1919 in this department of *THE JOURNAL*, which also in the issue of Feb. 17, 1923 discussed at some length the first Post Office fraud order brought against Brown, under the name Magnolia Remedy Company. Brown declared that his nostrum consisted chiefly of a compound of creosote, Donovan's solution and extract of malt. The federal chemists, however, had testified that the stuff contained neither arsenic nor mercury, both of which are components of Donovan's solution. The Creoco Remedy Company was the trade style used by Brown to evade this fraud order, and when a second fraud order was issued against him, this time under the name Creoco Remedy Company, Brown again flouted the government order by continuing his fraud and adopting the name Rudolph Brown. On Aug. 3, 1936 a third fraud order was issued, this one covering the name Rudolph Brown. But D. H. Brown, running true to form, also evaded this third fraud order by continuing in business and using the name of his daughter, Pauline Brown. On April 19, 1940 the Post Office Department issued its fourth fraud order against the business by closing the mails to the name Pauline Brown. Maybe he has more children whose names he can defile—then again he may persuade John Doe to let him use his name.

All of these cases merely serve to illustrate that the issuance of a fraud order results from a civil action (U. S. Code, Title 39, Sec. 259) and not a criminal one. Presumably in these cases there was insufficient evidence on which to institute criminal proceedings under U. S. Code, Title 18, Sec. 338. A conviction under that section is punishable by a fine not exceeding \$1,000 or imprisonment for a term not in excess of five years, or both. (For further details in regard to these civil and criminal statutes see *THE JOURNAL*, Nov. 2, 1940, p. 1566.)

Correspondence

EFFECTS OF ALUMINUM HYDROXIDE ON ABSORPTION OF PHOSPHORUS

To the Editor:—The following comments on the effect of aluminum hydroxide on the absorption of phosphorus may be of interest in considering this topic in relation to ulcer therapy.

In the January 3 issue of *THE JOURNAL*, Dick and Eisele state, in their article on "The Treatment of Peptic Ulcer Without Alkalis," that "therapeutic doses of aluminum hydroxide may interfere with the absorption of inorganic phosphorus from the intestinal tract, thereby deranging the calcium metabolism of the body." Two references were given in support of this statement. One was by Street and Barlow and told of the reduced rate of growth in rats fed a diet containing aluminum sulfate and only the minimal amount of phosphorus (0.24 per cent) necessary for normal growth. The other reference was to work that Willie Mae Freeman and I did on the use of aluminum hydroxide as an agent to reduce retention of phosphorus in children with an elevated serum inorganic phosphorus due to chronic renal insufficiency. A more detailed account of the latter study appeared in the *American Journal of Diseases of Children* (61:981 [May] 1941). In neither report are the diets employed comparable to those generally consumed by a patient on an "ulcer diet."

The effect of aluminum hydroxide on the urinary inorganic phosphorus excretion of normal persons receiving a "light ulcer diet" is reported in the *Archives of Internal Medicine* (67:563 [March] 1941) by Fauley, Freeman, Ivy, Atkinson and Wigodsky. The inorganic phosphorus of the urine was reduced to approximately 60 per cent of its previous value by the daily ingestion of 240 cc of 5 per cent aluminum hydroxide. The diet of these subjects contained approximately 2 Gm of phosphorus daily and was similar to a "light ulcer diet." In discussing these findings the authors state that conditions predisposing to the development of a negative phosphorus balance on aluminum hydroxide gel therapy are not likely to be present for a prolonged period in the patient with ulcer. This statement is true because the ordinary ulcer diet contains liberal amounts of phosphorus.

If phosphorus rich products, such as milk and cheese, are omitted from the diet of the person consuming therapeutic amounts of aluminum hydroxide, or if there is an insufficiency of pancreatic juice, a negative phosphorus balance may occur. A number of factors which influence the effect of aluminum hydroxide on phosphorus absorption were pointed out in the last two articles mentioned.

Consideration of the properties of aluminum sulfate appears irrelevant to the problem of ulcer therapy, except that this compound may serve to illustrate some properties of the aluminum ion. While the qualitative effect of aluminum hydroxide and aluminum sulfate on phosphorus absorption might be similar, there may be decided differences quantitatively. The results reported by Street and Barlow point directly to this conclusion, as they found that an aluminum hydroxide powder had much less effect on the growth of rats than did a corresponding amount of aluminum present as the sulfate. The results of Fauley and his associates indicate that aluminum hydroxide is much less active than the chloride in extracting phosphorus from the intestine.

The normal kidney is capable of remarkable economy in the conservation of phosphates, as is evidenced by the fact that the element largely disappears from the urine of animals maintained on a phosphorus deficient diet. Renal impairment, starvation, acidosis and bone disease are illustrative of conditions

alter the normal relation between intake and excretion of phosphorus, consequently in such conditions the urinary phosphates no longer serve to indicate the extent of absorption of this element from the intestine. However, excluding the excessive mobilization of this element from the tissues of the body, its presence in even moderate amounts in the urine argues against a phosphorus deficiency.

The available data furnish inadequate proof that the ulcer patient, maintained on a phosphorus rich diet, will experience a phosphorus deficiency as the result of using aluminum hydroxide as an antacid.

SMITH FREEMAN, M.D.,
Chicago

TYPHOID IN THE SOUTH

To the Editor.—In Queries and Minor Notes in THE JOURNAL, January 24, page 337, under the heading "Typhoid Immunization," I find published one of the common slurs made against the South by certain persons who seem to be ignorant of the facts. The expression that is particularly offensive in the letter is "It is common knowledge that, throughout the South, typhoid is pandemic and primitive conditions exist." This communication is signed by one Dr O L Murphy of Simsbury, Conn. Dr Murphy is much concerned about the army camps in the South.

There has been a myth handed down from generation to generation in certain regions in the North and in the New England states especially to the effect that there hangs over the South a terrible poisonous vapor and that the soil is a primitive swamp filled with noxious reptiles and insects in which situation no one but a native "red-neck" can live—that the whole South is a hot bed of malaria, yellow fever, cholera and every plague known to man.

Dr Murphy states "It is common knowledge that, throughout the South, typhoid is pandemic." Dr Murphy either does not know the meaning of the word pandemic or does not know that there is no pandemic of typhoid in the South. I rather believe that he does not even know the meaning of the word. Dorland's Medical Dictionary defines pandemic as "(1) widely epidemic, (2) a widespread epidemic." In other words, a pandemic is worse than an epidemic, and, if typhoid is pandemic in the South, it means that practically all of the population in each state is suffering from an epidemic of typhoid.

Coming down to facts, during 1940 there were only twenty-one deaths in Mississippi from typhoid out of a population of more than two million people. We had more deaths occur from old people stumping their toes and falling during the same period.

Another fact is that the death rates of Mississippi and Connecticut for the year 1940, and as published in a report from the Bureau of the Census on Oct 17, 1941, show that the death rate in Connecticut was 10.5 and that in Mississippi it was 10.6, just 0.1 per cent higher, even in the face of the fact that Connecticut's population is 98.1 white, while Mississippi's population is only 50 per cent white. The white death rate in Mississippi during 1940 was 8.6 per thousand which is almost 2 per thousand population less than the death rate in Connecticut. In fact, when the white death rate in Mississippi is compared with the total death rates in all states containing less than 10 per cent Negro population there are only a couple of states in the union which have lower death rates than Mississippi.

It seems that there ought to be a campaign of education throughout some sections of the United States to teach a certain class of people that the Civil War ended seventy-seven years ago.

Medical Examinations and Licensure

COMING EXAMINATIONS AND MEETINGS

UNITED STATES PUBLIC HEALTH SERVICE

Examination Assistant Surgeon (medical only), commissioned corps
Examinations will be held as follows:
U S P H S Relief Station, 424 Federal Bldg, Los Angeles March 9
Colorado Psychopathic Hospital, Denver March 11
U S Marine Hospital, Kirkwood, Mo March 13
U S P H S Hospital Fort Worth, Texas March 27
U S Marine Hospital, New Orleans March 30
Liaison Office, U S P H S, Room 319, Grant Bldg, Atlanta, Ga March 31
Apply Surgeon General, U S P H S, Washington, D C

BOARDS OF MEDICAL EXAMINERS

BOARDS OF EXAMINERS IN THE BASIC SCIENCES

Examinations of boards of medical examiners and boards of examiners in the basic sciences were published in THE JOURNAL, February 28, page 751.

NATIONAL BOARD OF MEDICAL EXAMINERS

NATIONAL BOARD OF MEDICAL EXAMINERS, Part III Various centers, June Exec Sec, Mr Everett S Elwood, 225 S 15th St, Philadelphia

EXAMINING BOARDS IN SPECIALTIES

AMERICAN BOARD OF ANESTHESIOLOGY Oral Part II Atlantic City, June 7 Final date for filing application is March 7 Sec, Dr Paul M Wood, 745 Fifth Ave, New York

AMERICAN BOARD OF DERMATOLOGY AND SYPHILOLOGY Oral Groups A and B Cleveland Jan 14-15, 1943 Final date for filing application is Dec 7 Written Various centers, Nov 16 Final date for filing application is Oct 5 Sec, Dr C Guy Lane, 416 Marlboro St, Boston

AMERICAN BOARD OF INTERNAL MEDICINE Oral St Paul, April, in advance of the meeting of the American College of Physicians, and Philadelphia, June in advance of the meeting of the American Medical Association Applications should be on file 6 weeks in advance of the date of oral examination Written Oct 19 Final date for filing application is Sept 1 Sec, Dr William S Middleton, 1301 University Ave, Madison Wis

AMERICAN BOARD OF NEUROLOGICAL SURGERY New York, May 12-13 Sec, Dr R Glen Spurling, 404 Brown Bldg, Louisville, Ky

AMERICAN BOARD OF OPHTHALMOLOGY Oral Baltimore, June 6 and Philadelphia, June 8 Sec, Dr John Green, 6830 Waterman Ave, St Louis

AMERICAN BOARD OF RADIOLOGY Oral All Groups Atlantic City, June 4 Final date for filing application is April 1 Sec, Dr Byrl R. Kirklin, 102-110 Second Ave, S W, Rochester, Minn

Minnesota October Report

The Minnesota State Board of Medical Examiners reports the written examination for medical licensure held at Minneapolis, Oct 21-23, 1941. The examination covered 12 subjects and included 60 questions. An average of 75 per cent was required to pass. Sixty-nine candidates were examined, all of whom passed. Ten physicians were licensed to practice medicine by reciprocity and 5 physicians so licensed on endorsement of credentials of the National Board of Medical Examiners. The following schools were represented:

School	PASSED	Year Grad	Number Passed
Stanford University School of Medicine	(1940)		1
University of Colorado School of Medicine	(1940)		1
Yale University School of Medicine	(1940)		1
Georgetown University School of Medicine	(1940)		1
Emory University School of Medicine	(1939)		1
Loyola University School of Medicine	(1941)		1
Northwestern University Medical School	(1936), (1940-2), (1941-3)		6
Rush Medical College	(1938), (1939-2)		3
University of Chicago The School of Medicine	(1939), (1941)		2
University of Illinois College of Medicine	(1941)		1
Indiana University School of Medicine	(1938-2)		2
State University of Iowa College of Medicine	(1940-2)		2
University of Louisville School of Medicine	(1938)		1
Johns Hopkins University School of Medicine	(1919-2)		2
University of Maryland School of Medicine	(1939)		1
Harvard Medical School	(1941)		1
University of Minnesota Medical School	(1939), (1940-2), (1941-21)		29
Duke University School of Medicine	(1938)		2
Ohio State University School of Medicine	(1940)		1
University of Cincinnati College of Medicine	(1940)		1
University of Oklahoma School of Medicine	(1937)		1
University of Oregon Medical School	(1940)		1
University of Pennsylvania School of Medicine	(1939)		1
University of Texas School of Medicine	(1938), (1939-2)		3
University of Wisconsin Medical School	(1939)		1
Marquette University School of Medicine	(1941)		1
McGill University Faculty of Medicine	(1939)		1

School	LICENSED BY RECIPROCITY	Year Grad	Reciprocity with
Stanford University School of Medicine	(1938)		California
Northwestern University Medical School	(1940)		Illinois
State University of Iowa College of Medicine	(1940)		Iowa
Wayne University College of Medicine	(1935)		Michigan
University of Minnesota Medical School	(1939)		Michigan
Creighton University School of Medicine	(1927)		Nebraska

R N WHITFIELD, M.D. Jackson, Miss

Director, Vital Statistics Mississippi
State Board of Health

University of Nebraska College of Medicine.....	(1938)	Nebraska
University of Oklahoma School of Medicine.....	(1940)	Oklahoma
Jefferson Medical College of Pennsylvania.....	(1923)	Penna.
Marquette University School of Medicine.....	(1937)	Louisiana
School	LICENSED BY ENDORSEMENT	Year Grad.
College of Medical Evangelists.....	(1936)	
Loyola University School of Medicine.....	(1937)	
Northwestern University Medical School.....	(1940)	
Harvard Medical School.....	(1937)	
University of Minnesota Medical School.....	(1941)	

Bureau of Legal Medicine and Legislation

MEDICOLEGAL ABSTRACTS

Malpractice: Death from Pulmonary Embolism Following Tonsillectomy.—The physician defendant completed a tonsillectomy on Mrs. Michael at a hospital in Rochester, N. H., about 9:40 a. m. According to the bedside notes, her condition was then "good." At 10 o'clock she vomited a moderate amount of blood and apparently bled continuously until 12:05 p. m. The physician was notified of this condition three times between 10 and 10:50, but being engaged in another operation he was unable to visit the patient until the latter time. After examining her, he was convinced that she was in no immediate danger and accordingly deferred action until the operating room was again available. At 12:05 she was returned to the operating room and was then "bleeding from left fossa." Monsel's solution and pressure were administered and bleeding or oozing immediately stopped, but as an extra precaution a sponge was stitched into the fossa. The patient was not bleeding on leaving the table. When the patient was taken from the operating room her pulse was of good quality and her condition was better. The physician then left the hospital to make a call elsewhere. At 1:15 the patient started to spit bright red blood, and an attempt was made to call the physician defendant but he could not be reached immediately, and at 1:20 two other physicians were called. At 1:25 the patient was "cyanotic with bright red blood purging from mouth." At 1:28 another physician arrived and immediately gave oxygen and artificial respiration, but the patient died about 1:45, death being immediately caused by a pulmonary embolism. The physician defendant arrived shortly after her death. Subsequently, the administrator of the patient's estate brought suit against the physician for malpractice. The trial court directed a verdict for the defendant and the plaintiff brought exceptions to the Supreme Court of New Hampshire.

The malpractice of which the physician had been guilty the plaintiff claimed was a "negligent failure to give proper care and attention following the operation." If, said the Supreme Court, a finding that the physician defendant was at fault might be made on the evidence that he undertook another operation immediately after the operation on the patient was completed so that he was unable to respond to the first three calls made by the patient's nurse and, second, that he responded to a call outside of the hospital soon after the patient had been treated the second time, the plaintiff's case nevertheless would fail because the evidence does not establish the causal connection between these alleged acts of neglect and the patient's death. The immediate cause of the patient's death was a pulmonary embolism, described in the testimony as a foreign body, such as a blood clot, which finds its way into the blood stream and goes "whirling through the circulation" until it strikes a blood vessel too small to permit its passage and plugs it. According to the defendant, there is "no way known to the medical profession to anticipate or prevent an embolism." The plaintiff, on the other hand, produced testimony that it was "the continued bleeding from the operation which brought about the embolism" and argued that the prolonged period of bleeding disclosed by the evidence might have been avoided if the defendant had given the patient adequate attention. There is no basis, answered the court, in the evidence, however, for finding that the embolism in question had started prior to the second operation. The

patient left the operating room after that operation with the bleeding completely stopped and generally in fair condition. Any evidence of negligence prior to that time may, therefore, be dismissed as noncausal. At 1:15 the patient began to spit "bright red blood," and the defendant gave as his opinion that "that's when she probably had the start of her embolism." He further testified that, assuming that she died from an embolism, there was nothing in his judgment that anybody could have done to prevent it. This, said the Court, was a question on which the uninformed judgment of the jury was worthless and expert testimony was essential. Since the defendant's testimony was the only evidence in the case on this point, it must be accepted as true. It was obviously fatal, therefore, to the plaintiff's contention that the patient's death was due to neglect following the second operation.

On behalf of the plaintiff there was offered a medical witness—a surgeon residing in Revere, Mass., but whose practice was largely in Boston. The trial judge refused to permit him to answer certain questions as to the propriety of the treatment in this case and the possibility of other treatment. It cannot be said, said the Court, as a matter of law that there was error in these rulings. This physician was practicing in Boston. Since a person who holds himself out as practicing a particular profession is required only to possess the knowledge and to exercise the care and skill of the ordinary practitioner of that profession in the same place or in similar localities, the opinion of a Boston physician as to what the defendant practicing in the small town of Rochester might or ought to have done was not receivable.

The judgment in favor of the defendant was accordingly affirmed.—*Michael v. Roberts*, 23 A. (2d) 361 (N. H., 1941).

Society Proceedings

COMING MEETINGS

- Alabama, Medical Association of the State of, Montgomery, Apr. 21-23. Dr. D. L. Cannon, 519 Dexter Avenue, Montgomery, Secretary.
- American Association of Anatomists, New York, April 1-3. Dr. Eliot R. Clark, Dept. of Anatomy, University of Pennsylvania School of Medicine, Philadelphia, Secretary.
- American Association of Industrial Physicians and Surgeons, Cincinnati, Apr. 13-17. Dr. Edward C. Holmblad, 28 East Jackson Blvd., Chicago, Managing Director.
- American Association of Pathologists and Bacteriologists, St. Louis, April 2-3. Dr. Howard T. Karsner, 2085 Adelbert Rd., Cleveland, Secretary.
- American College of Physicians, St. Paul, Apr. 20-24. Mr. E. R. Loveland, 4200 Pine St., Philadelphia, Executive Secretary.
- American Federation for Clinical Research, Minneapolis, Apr. 20-21. Dr. Thomas M. Durant, 3401 North Broad St., Philadelphia, Secretary.
- American Pediatric Society, Sky Top, Pa., Apr. 30-May 2. Dr. Hugh McCulloch, 325 North Euclid Ave., St. Louis, Secretary.
- American Physiological Society, Boston, March 30-April 4. Dr. Carl J. Wiggers, 2109 Adelbert Rd., Cleveland, Secretary.
- American Society for Experimental Pathology, Boston, April 1-3. Dr. Harry P. Smith, Medical Laboratory Bldg., Iowa City, Secretary.
- American Society for Pharmacology and Experimental Therapeutics, Boston, March 31-April 4. Dr. Raymond N. Dieter, University of Minnesota Medical School, Minneapolis, Secretary.
- American Society of Biological Chemists, Boston, Apr. 7. Dr. A. K. Balls, Bureau of Agricultural and Engineering Chemistry, Washington, D. C., Secretary.
- American Surgical Association, New Orleans, Apr. 6-8. Dr. Charles G. Mixer, 319 Longwood Ave., Boston, Secretary.
- Arkansas Medical Society, Hot Springs National Park, Apr. 27-29. Dr. W. R. Brooksher, 602 Garrison Ave., Fort Smith, Secretary.
- Federation of American Societies for Experimental Biology, Boston, March 31-April 4. Dr. D. R. Hooker, 19 West Chase St., Baltimore, Secretary.
- Florida Medical Association, Palm Beach, Apr. 13-15. Dr. Sherr Richardson, 111 West Adams St., Jacksonville, Secretary.
- Georgia, Medical Association of, Augusta, Apr. 28-May 1. Dr. E. D. Shanks, 478 Peachtree St. N.E., Atlanta, Secretary.
- Iowa State Medical Society, Des Moines, Apr. 15-17. Dr. Robert L. Parker, 3510 Sixth Ave., Des Moines, Secretary.
- Louisiana State Medical Society, New Orleans, Apr. 27-29. Dr. F. T. Talbot, 1430 Tulane Ave., New Orleans, Secretary.
- Maryland, Medical and Chirurgical Faculty of, Baltimore, Apr. 23-25. Dr. Richard T. Shackelford, 1211 Cathedral St., Baltimore, Secretary.
- Missouri State Medical Association, Kansas City, Apr. 27-29. Mr. E. H. Bartelsmeyer, 634 North Grand Blvd., St. Louis, Executive Secretary.
- New Jersey, Medical Society of, Atlantic City, Apr. 21-23. Dr. Alfred Stahl, 55 Lincoln Park, Newark, Secretary.
- New York, Medical Society of the State of, New York, Apr. 27-30. Dr. Peter Irving, 292 Madison Ave., New York, Secretary.
- Ohio State Medical Association, Columbus, Apr. 28-30. Mr. C. S. Nelson, 79 East State St., Columbus, Executive Secretary.
- Oklahoma State Medical Association, Tulsa, Apr. 29-May 1. Mr. E. H. Graham, 210 Plaza Court Bldg., Oklahoma City, Executive Secretary.
- Tennessee State Medical Association, Memphis, Apr. 14-16. Dr. H. H. Shoulders, 106 Church St., Nashville, Secretary.

Current Medical Literature

AMERICAN

The Association library lends periodicals to members of the Association and to individual subscribers in continental United States and Canada for a period of three days. Three journals may be borrowed at a time. Periodicals are available from 1932 to date. Requests for issues of earlier date cannot be filled. Requests should be accompanied by stamps to cover postage (6 cents if one and 18 cents if three periodicals are requested). Periodicals published by the American Medical Association are not available for lending but can be supplied on purchase order. Reprints as a rule are the property of authors and can be obtained for permanent possession only from them.

Titles marked with an asterisk (*) are abstracted below.

American Heart Journal, St. Louis

22:583-718 (Nov.) 1941

- Pernio Vascular Disease. Teresa McGovern and I. S. Wright, with collaboration of E. Kruger, New York—p. 583.
- Incidence of Types of Heart Disease Among 3026 Autopsies, with Special Reference to Age and Sex. B. J. Clawson, Minneapolis—p. 607.
- Normal Electrocardiogram. I. Analysis of Extremity Derivations from 100 Normal Persons Whose Ages Ranged from Thirty to Fifty Years. K. Larsen, Copenhagen, Denmark, and T. Skulason, Reykjavik, Iceland—p. 625.
- Id. II. Analysis of Precordial Derivations *d* and *s* from 100 Normal Persons Whose Ages Ranged from Thirty to Fifty Years. T. Skulason, Reykjavik, Iceland, and K. Larsen, Copenhagen, Denmark—p. 645.
- Significance of Tensility of Aorta as Index of Aging Process in Animal Body. Jean Hume Nelbach and L. P. Herrington, New Haven, Conn.—p. 661.
- Digitalis and Normal Work. Electrocardiogram. I. M. Liebow and H. Leil, Cleveland—p. 683.
- Myocardial Necrosis in Diphtheria, with General Review of Lesions of Myocardium in Diphtheria. K. Y. Chin and C. H. Huring, Peiping, China—p. 690.

American Journal of Diseases of Children, Chicago

62:1129-1376 (Dec.) 1941

- *Level of Vitamin A in Blood as Index of Vitamin A Deficiency in Infants and Children. J. M. Lewis, O. Bodansky, and C. Haug, New York—p. 1129.
- Physical and Chemical Properties of Sputum. II. Influence of Drugs: Steam, Carbon Dioxide and Oxygen. F. P. Basch, P. Holinger, and H. G. Poncher, Chicago—p. 1149.
- Factors Influencing Retention of Nitrogen and Calcium in Period of Growth. V. Further Evidence of Anabolic Effect of Thyroid on Calcium Metabolism. J. A. Johnston, Detroit—p. 1172.
- Prevention of Dental Caries by Massive Doses of Vitamin D. R. H. Brodsky, B. Schick, and H. Vollmer, New York—p. 1183.
- Hematologic Standards for Healthy Newborn Infants. Erythrocyte Count, Hemoglobin Content, Cell Volume, Color Index, Volume Index, and Saturation Index. E. G. Chinnard, E. E. Osgood, and Dorothy M. Ellis, Portland, Ore.—p. 1188.
- Tuberculin Test. Comparative Results of Intradermal and Patch Test for 1000 Patients. H. A. Reisman, Jamaica, N. Y., and M. Grozin, Hushing, N. Y.—p. 1197.
- Stimulation of Pertussis Protective Antibodies by Vaccination. Comparative Study of Protective Agglutinating and Complement Fixing Antibodies. Lucy Mishulow, E. T. Wilkes, Mildred M. Liss, Edna Lewis, Sadie R. Berkey, and Lillian Leifer, New York—p. 1205.
- *Combined Cod Liver Oil and Liquid Petrolatum Pneumonia in Child. L. Kaplan, Chicago—p. 1217.
- Correlation of Aorta in Childhood. Report of Two Cases in Which Diagnosis Was Confirmed by Intravenous Injection of Diodrast. S. Blumenthal, New York, and D. B. Davis, Los Angeles—p. 1224.
- Sirenomelia Monster (Symposium). Anatomic Presentation. H. P. Newhill, New Orleans—p. 1233.
- *Renal Hypertension in Children. Clinicopathologic Studies. S. T. Killian and J. K. Calvin, Chicago—p. 1242.

Level of Vitamin A in Blood.—Lewis and his associates gave 144 infants diets containing varying amounts of vitamin A and determined the relation of the intake to the level in the blood and to dark adaptation. The ages of the infants varied from 3 weeks to 18 months. They were residing in a home for child care. Determinations were also carried out on 157 children, 6 to 12 years of age, in the children's medical division of Bellevue Hospital. Nineteen of these children (normal) were admitted for a minor cutaneous ailment, 118 because of various disorders (infection of the upper respiratory tract, rheumatic fever, dysentery, asthma, renal calculus, glomerulonephritis, erysipelas, sickle cell anemia and Hodgkin's disease) and 20 because of fever. The average concentration of vitamin A in the blood for the three groups was respectively, 117 units per

hundred cubic centimeters for the normal 89 for the afebrile and 44 for the febrile group. None of the normal children had high dark adaptation thresholds, only 1 of the 118 children showed poor dark adaptation and 4 of the 20 children with fever had poor dark adaptation. The lowest level of the vitamin in the blood in the 144 normal infants was 45 U. S. P. units per hundred cubic centimeters. Values below this level were obtained for infants given diets devoid of vitamin A and for those with disorders affecting the absorption of fat. A low level of vitamin A in the blood was associated with poor dark adaptation and with low hepatic storage of the vitamin. The observations show that a low level of vitamin A in the blood indicates a vitamin A deficiency. The daily administration of 17,000 units of vitamin A to infants during the first six months of life increased the vitamin A content of the blood. However, no appreciable effect on the level was noted when infants 6 to 18 months of age were given the vitamin daily for one to five months. To determine the effect of vitamin A concentrates on the level of the vitamin in the blood in febrile diseases 8 children 6 months to 8 years of age were given 17,000 to 120,000 units of the vitamin. In 7 there was a rise in the level of the vitamin in the blood in twenty-four hours, and in 6 the vitamin A content became normal in twenty-four to forty-eight hours. The average level of the vitamin was 41 units prior to the administration of the vitamin and 83 units after it had been given. Of the 118 afebrile children 22 had a low concentration of vitamin A but normal dark adaptation. This suggests that the level of vitamin A in the blood may be a more sensitive indicator of vitamin A deficiency than the dark adaptation test. However, occasionally a normal level of the vitamin in the blood may be observed when abnormal dark adaptation exists. To investigate fully the vitamin A status the dark adaptation test and determination of the level of vitamin A in the blood should be carried out whenever possible.

Lipid Pneumonia.—Kaplan reports an instance of pneumonia caused by cod liver oil and liquid petrolatum. After the death of the patient, a Negro boy aged 17 months, the two oils were identified by a histochemical method utilizing sudan IV, Nile blue sulfate, osmic acid and the Ziehl-Neelsen stain. Microscopic study of the lungs revealed the typical structure of acute and chronic interstitial lipid pneumonia. The oil was found both free and in large macrophages. By the functional methods one oily substance was found as intracellular droplets in the older perihilar lesions. It stained orange red with sudan IV, blue with Nile blue sulfate, black with osmic acid and reddish purple with the Ziehl-Neelsen stain. The second oil was diffused in all lobes and made up the bulk of the intrapulmonary oil. It stained yellow orange with sudan IV and pink with Nile blue sulfate but did not stain with osmic acid or the Ziehl-Neelsen stain. Much of this oil was found extracellularly, indicating recent administration. The conclusion was that the pulmonary condition was a combination of chronic cod liver oil pneumonia and recent liquid petrolatum or iodized poppyseed oil pneumonia. The boy's history revealed that cod liver oil had been administered for fourteen months but that it had not been given during the three months before death. During the patient's last hospitalization 1½ ounces (45 cc.) of liquid petrolatum had been given daily for twenty-seven days for persistent constipation. The child's death, caused by severe acute hemorrhagic bronchopneumonia, was precipitated by the aspiration of the liquid petrolatum. If the histochemical method had not been employed the case probably would have been recorded as one of bronchopneumonia superimposed on cod liver oil aspiration pneumonia.

Renal Hypertension.—Killian and Calvin present 6 cases of persistent hypertension in children 4½ to 14 years of age admitted to the Michael Reese Hospital between 1930 and 1941. One or both kidneys of the children were obtained for study. Four patients came to necropsy, and 2 underwent unilateral nephrectomy and were alive at the time of the report. The persistence of the hypertension was established by frequent study of the blood pressure. During the eleven years of the study necropsy was performed on 3 children with subacute or chronic

glomerulonephritis. Elevated blood pressure was present in each of them. Chronic bilateral pyelonephritis was present in 1 in addition to the glomerulonephritis. Although chronic glomerulonephritis is usually accompanied by hypertension, it is a relatively less frequent cause of hypertension in children than was heretofore assumed. In the 6 children with renal hypertension the diagnosis was as follows: congenital unilateral hypoplasia of the kidney with nephrosclerosis, chronic bilateral pyelonephritis with contraction of the kidneys, chronic bilateral pyelonephritis with arteriolonecrosis, bilateral hydronephrosis with chronic pyelonephritis, traumatic rupture of a hydronephrotic kidney and subacute glomerulonephritis with arteriolonecrosis. The interference with the renal vascular supply which was observed anatomically could have been responsible for the hypertension in each instance. In most of the children the disease might have responded to urologic management if the hypertension had been detected before irreversible damage had occurred or if the renal condition had been diagnosed before the hypertension became manifest. The persistent hypertension in the children whose kidneys were examined pathologically was usually of renal origin. Persistent hypertension in children is evidently more common than has been appreciated.

American Journal of Medical Sciences, Philadelphia

202:781-928 (Dec.) 1941

- Acetylphenylhydrazine Anemia: I. Mechanism of Erythrocyte Destruction and Regeneration. W. O. Cruz, Rochester, N. Y.—p. 781.
- *Results of Chemotherapy in Subacute Bacterial Endocarditis. H. Field Jr., Ann Arbor, Mich.; S. W. Hoobler, Boston, and N. L. Avery Jr., Ann Arbor, Mich.—p. 798.
- *Treatment of Tularemia with Acriflavine. F. L. Loria, New Orleans.—p. 803.
- *Local Treatment of Pyogenic Cutaneous Infections with Sulfathiazole in Emulsion Base. D. M. Pillsbury, Virgene Schirer Wammock, C. S. Livingood and Anna C. Nichols, Philadelphia.—p. 808.
- Causative Relationship of Dermatophytosis to Thromboangiitis Obliterans. M. Naide, Philadelphia.—p. 822.
- Vitamin A and Ascorbic Acid in Pulmonary Tuberculosis: Determination in Plasma by Photoelectric Colorimeter. H. R. Getz and T. A. Koerner, Philadelphia.—p. 831.
- Experimental Hypoprothrombinemia. J. E. Rhoads, R. Warren and Lillian M. Panzer, Philadelphia.—p. 847.
- Relationship of Hypoalbuminemia to Edema of Malaria. I. Kopp and H. C. Solomon, Boston.—p. 861.
- Significance of Target Cells in Anemia. M. G. Bohrod, Miami Beach, Fla.—p. 869.
- *Staphylococcal Meningitis Treated with Asparagin Bacteriophage: Two Cases. P. S. MacNeal, Philadelphia, and D. B. Foster, Ann Arbor, Mich.—p. 874.
- Note on Localized Lipid Atrophy in Diabetes. Z. T. Wirtschafter and E. D. Schwartz, Cleveland.—p. 880.

Chemotherapy in Subacute Bacterial Endocarditis.—

Field and his associates report on the treatment of 36 patients with subacute bacterial endocarditis who received sulfanilamide and/or one of its derivatives for more than one week. There was 1 recovery. All the patients received chemotherapy for more than two weeks before death. Three patients had a complete remission of fever, with repeatedly negative blood cultures for eighteen days, nineteen days and two months, respectively, before death. One of these, with cerebral hemorrhage, was 1 of 5 given heparin continuously. The other 2 relapsed and died in spite of continued chemotherapy. The other 4 patients receiving a continuous intravenous infusion of heparin recovered. The experience warrants persistence in the accumulation of data concerning the different adjuncts to chemotherapy and the selection of a sulfanilamide derivative on the basis of bacteriostasis, demonstrable in vitro, for the strain of organism obtained from the individual patient. The authors state that they have not obtained, even temporarily, sterilization of the blood as frequently as has been reported by most other workers. It seems probable that chemotherapy should be continued for a long time, in most cases, in order to destroy all of the organisms in the vegetations.

Acriflavine Treatment of Tularemia.—Loria treated with acriflavine 1 patient with acute and 2 with chronic tularemia. The results, in his opinion, justify further investigation to determine the true value of the drug. Each of his 3 patients has been observed from time to time; each is well, has gained weight, feels fine and is back at work. The administration of acriflavine was followed by a definite clinical improvement. In the first patient the fever definitely declined after the use of the drug;

the fever of the other 2—although it tended to lessen—did not appear to be as definitely affected. The disease of these 2 patients was chronic when diagnosed by the author; the patients sought relief from a recrudescence attack. No disagreeable reactions followed the use of the drug. The author feels that acriflavine probably acted as a bacteriostat, inhibiting the growth of the organism sufficiently to give the host time to increase the antibodies to the point of overcoming the infection. The body defense was not definite until acriflavine was administered.

Sulfathiazole for Pyogenic Cutaneous Infections.—

Pillsbury and his collaborators used sulfathiazole locally in the treatment of 190 patients with cutaneous pyogenic infections. An attempt was made to determine the effectiveness of such therapy, the most efficient vehicle for the local application of the drug, the evidence of local or general toxicity incident to the therapy and its effect on the bacteria found in cutaneous pyogenic lesions. The vehicles tried were grease, a "vanishing" stearate, pectin and an oil in water emulsion. It was assumed that if the emulsion type base was to be regarded as 90 per cent efficient the effectiveness of the stearate base could be placed at approximately 70 per cent and that of the grease base at 50 per cent or less. Experience with pectin was limited. Rapidity of action on the infection was the first criterion. The frequency of application necessary, the subjective sensations of the patient, washability and apparent penetration under crusts and debris to the site of infection were secondary considerations. Sulfathiazole in an oil in water emulsion proved effective for the treatment of primary superficial infections of the skin, including staphylococcal or streptococcal impetigo, infectious eczematoid dermatitis, Bockhart's follicular impetigo and superficial ecthyma. It was equally effective for acute secondary infection, pyogenic complications of fungous infection and of dermatitis venenata. Sulfathiazole ointment was useful for the treatment of chronic deep ulcers of the skin and the subcutaneous tissue. There was no evidence of absorption of sulfathiazole and no local or general toxic reactions. Superficial infections from which streptococci were recovered responded more rapidly and completely than those yielding staphylococci on culture. Twelve of 28 patients with infections previously resistant to other types of therapy were cured when hemolytic streptococci were the sole or the predominant organisms. When the predominant organism revealed by the culture was the staphylococcus only 4 of 26 patients were cured and 10 were unimproved.

Staphylococcal Meningitis.—MacNeal and Foster reviewed records of 17 patients with bacteriologically proved *Staphylococcus aureus* meningitis encountered at the Pennsylvania Hospital from 1925 through 1940. One patient, given massive doses of staphylococcus antitoxin (320,000 units) and sulfapyridine by mouth until the blood level reached 8 mg. per hundred cubic centimeters, was discharged as cured; later investigation, however, revealed that he had had a relapse and died of the infection. The mortality for the 17 patients was 100 per cent. The fact that there are only 15 recorded recoveries prompts the authors to describe the treatment with asparagin bacteriophage of 2 patients with the disease and to add the recovery of 1 of them to the list. The bacteriophage was given full strength intravenously, but for intrathecal injection it was diluted 1:4 with a 0.4 per cent solution of sodium chloride to make the resulting solution hypotonic. The patient, a white man aged 41, originally had been admitted to the hospital for malarial hyperpyrexia treatment of neurosyphilis. The following day a diagnostic lumbar puncture was performed, and within four hours the patient suffered a shaking chill with a rise in temperature to 104 F. The following morning nuchal rigidity and Kernig's sign were present. Culture of the spinal fluid at this time revealed a profuse growth of *Staphylococcus aureus*. Bacteriophage therapy by the intravenous and the intrathecal routes was begun at once, and the patient was discharged as cured thirty days after admission. The patient had been given 395 cc. of bacteriophage intravenously and 154 cc. intrathecally. Two months after the bout of fever due to the meningitis he returned to the hospital feeling well and 20 pounds (9 Kg.) heavier. Malarial therapy was subsequently administered without mishap.

American J. Obstetrics and Gynecology, St. Louis

42:925-1118 (Dec.) 1941. Partial Index

- *Role of Isoimmunization in Pathogenesis of Erythroblastosis Fetalis. P. Levine, Newark, N. J.; L. Burnham, Englewood, N. J.; E. M. Katzin, Newark, N. J., and P. Vogel, New York.—p. 925.
- Clinical Application of Roentgen Pelvimetry and Study of Results in 1,100 White Women. H. Thoms, New Haven, Conn.—p. 957.
- Extracellular Water in Late Pregnancy and Its Relation to Development of Toxemia. L. C. Chesley and Elizabeth R. Chesley, Jersey City, N. J.—p. 976.
- Significance of Fetal Environmental Differences. L. W. Sontag, Yellow Springs, Ohio.—p. 996.
- Complications of Irradiation Treatment of Carcinoma of Cervix. W. G. Cosbie, Toronto, Canada.—p. 1003.
- Anhydroxy Progesterone in Threatened Interruptions of Pregnancy. S. D. Soule, St. Louis.—p. 1009.
- Oral Therapy with Pregneninone in Functional Uterine Bleeding. H. Wiesbader, New York.—p. 1013.
- Postabortal Tetanus: Review of Literature and Report of Fourteen Additional Cases. B. B. Weinstein and W. D. Beacham, New Orleans.—p. 1031.
- *Endometritis and Tubal Ectopic Pregnancy. W. Schiller and Ruth B. Balkin, Chicago.—p. 1041.
- Arrhenoblastoma of Ovary. A. E. Kanter and A. B. Ragins, Chicago.—p. 1061.
- Fibrosarcoma of Buttock Associated with Pregnancy. L. P. Kirtz and M. D. Pareira, St. Louis.—p. 1066.
- Basal Cell Carcinoma of Vulva. W. Berman, St. Louis.—p. 1070.

Isoimmunization in Fetal Erythroblastosis.—Levine and his collaborators studied the blood of 153 mothers who delivered 1 or more infants with fetal hydrops, icterus gravis or anemia of the newborn. Statistical data on the Rh (Rhesus) factor in the blood of the 153 mothers reveal an incidence of about 90 per cent Rh— reactions in contrast to 15 per cent Rh— reactions in the random population. This striking difference in the incidence of the Rh factor in the two groups of mothers supports the concept of isoimmunization in the mothers of erythroblastic infants. Test on 89 fathers and on 76 infants with fetal erythroblastosis show, on the basis of the isoimmunization theory, that the affected infants and the husbands of the series of Rh— mothers are exclusively Rh+. In 93 per cent of the infants investigated fetal erythroblastosis resulted from the isoimmunization of the Rh— mother by the Rh factor in the erythrocytes of the fetus. In the remaining infants, blood factors other than Rh were responsible for the isoimmunization. Agglutination tests for the Rh factor indicate that a combination of an Rh— mother, an Rh+ father and an affected infant can be used as a laboratory test to support a diagnosis of fetal erythroblastosis and to distinguish between mild, atypical or borderline instances of the condition. Of prime importance is the Rh factor in the fetal blood, which is transmitted as a dominant mendelian gene from the father. The pathologic manifestations of fetal erythroblastosis are produced by the intrauterine action of maternal immune agglutinins on the susceptible erythrocytes of the fetus. It is probable that isoimmunization is also the cause of some habitual abortions and stillbirths. Fetal blood in one form or another probably penetrates the villus in sufficient quantity to induce immunization in the mother. Intragroup transfusion accidents associated with pregnancy can now be prevented by the use of Rh— blood donors and by means of a modified cross matching test.

Endometritis and Tubal Pregnancy.—Schiller and Balkin point out that endometritis under special conditions apparently does not prevent the ascent of the spermatozoa, which may reach the tube and fertilize an ovum if one is present in the lumen. Precocious embedding of the fertilized ovum, leading to a tubal pregnancy, may then occur. Such cases are rare but deserve mention as they support the experimental observation that the migration of spermatozoa is not prevented by a medium of purulent inflammation. The authors report 2 cases in which a tubal ectopic pregnancy and 1 severe endometritis coexisted. Physiologically, in tubal ectopic pregnancy a decidual reaction of the endometrium analogous to the decidual transformation of the endometrium in intrauterine pregnancy is observed. This decidual is cast off after the rupture or abortion of the ectopic pregnancy, that is, when contact between placenta and maternal tissue is severed. In their 2 cases the authors observed no actual decidual reaction of the endometrium. The few foci of decidual reaction in the first case were invaded by chorionic cells. This proves that they were remnants of the previous intrauterine pregnancy. The absence of a decidual response to the ectopic pregnancy can be explained by the endometritis which paralyzes the cytogenic cells and prevents them from responding normally

to the hormones of pregnancy. Similarly, in nonspecific generalized endometritis, the phases of the menstrual cycle generally are suppressed. Even in the premenstrual phase tortuous and secreting glands usually are not to be seen in an inflamed endometrium. In the first case the chorionic cells prove that the decidua originated from a previous intrauterine pregnancy and not from the present ectopic one.

American Journal of Tropical Medicine, Baltimore

21:717-812 (Nov.) 1941

- Studies on Protein Tyrosine Reaction as Diagnostic Test for Malaria. J. C. Swartzwelder and C. C. Adams, New Orleans.—p. 717.
- Distribution and Control of Schistosoma Dermatitis in Wisconsin and Michigan. D. B. McMullen, and S. Brackett, Chapel Hill, N. C.—p. 725.
- General Actions, Toxicity and Clinical Effects in Amebiasis of Kosam, an Oriental Amebicid. W. C. Kuzell, W. B. Layton, W. D. Fricke and W. C. Cutting, San Francisco.—p. 731.
- Malaria Reconnaissance of Province of Camaguey in Cuba. H. P. Carr, Havana, Cuba; J. F. Meléndez and A. F. Meléndez.—p. 739.
- Comparative Susceptibility of Two Strains of Anopheles Quadrimaculatus to Infection with Human Malaria Parasites. M. F. Boyd, Tallahassee, Fla.—p. 751.
- Strains of Anopheles Quadrimaculatus: Inheritance of Color Patterns in Larvae of Anopheles Quadrimaculatus. L. T. Coggeshall, New York.—p. 755.
- Surface Tension of Water in Relation to Behavior of Anopheles Larvae. P. F. Russell, Nilgiri, Madras Presidency, India, and T. R. Rao.—p. 767.
- Anopheles Pseudopunctipennis, Theobald, Vector of Malaria in Mexico. L. Vargas, G. Casis S., and W. C. Earle, Champaign, Ill.—p. 779.
- Are Experimental Data of Therapeutic Malaria Applicable to Conditions Obtaining in Nature? C. W. F. Winckel, Amsterdam, Holland.—p. 789.
- Atabrine Retardation of Schizogony in Plasmodium Cathemerium Infected Canaries. H. Beckman, Milwaukee.—p. 795.

Annals of Surgery, Philadelphia

114:961-1130 (Dec.) 1941

- Blood Transfusion Reactions: Their Causes and Prevention. L. M. Zimmerman, Anne Marie Strauss and H. Laufman, Chicago.—p. 961.
- *Treatment of Cervical Metastatic Cancer. H. Martin, New York.—p. 972.
- Pseudogastritis of Operative Origin. G. B. Sanders and P. M. McGray, Philadelphia.—p. 986.
- Rupture of Stomach Following Ingestion of Sodium Bicarbonate. W. T. Lemmon and G. W. Paschal Jr., Philadelphia.—p. 997.
- Preliminary Colostomy in Management of Gastrocolic and Gastrojejunocolic Fistulas. C. Mathewson Jr., San Francisco.—p. 1004.
- Surgical Management of Fecal Fistulas. C. W. Mayo and C. P. Schlicke, Rochester, Minn.—p. 1011.
- *Liver Glycogen and Lipid Concentrations Following Intravenous Glucose Administration and Diet in Dog and Man in Presence of Liver Damage. I. S. Ravdin, H. M. Vars, Elizabeth Thorogood, J. Schultz and J. Johnson, Philadelphia.—p. 1018.
- Torsion of Great Omentum: Report of Two Cases. P. J. Lipssett, Oakland, Calif.—p. 1026.
- Right Paraoduodenal Hernia. H. D. Cogswell and C. A. Thomas, Whiting, Ind.—p. 1035.
- Management of Varicose Veins of Lower Extremities. W. W. Heyerdale and L. K. Stalker, Rochester, Minn.—p. 1042.
- Visualization and Obliteration of Angiomas by Radiopaque Solutions. M. M. Pomeranz and I. S. Tunick, New York.—p. 1050.
- Active Immunization Against Tetanus. H. Gold, Chester, Pa.—p. 1060.
- *Influence of Temperature on Wounds. B. Brooks and G. Duncan, Nashville, Tenn.—p. 1069.
- Regeneration of Epiphyseal Cartilage: Experimental Study. S. W. Banks and E. L. Compere, Chicago.—p. 1076.
- *Infusions of Blood and Other Fluids via Bone Marrow in Traumatic Shock and Other Forms of Peripheral Circulatory Failure. L. M. Tocantins, J. F. O'Neill and A. H. Price, Philadelphia.—p. 1085.

Cervical Metastatic Cancer.—Martin believes that no single method of treatment is indicated for cervical carcinoma-metastasis and that often a combination of surgical intervention and irradiation is better than either alone. Although closely related, the management of the primary lesion and that of the cervical metastasis should be considered separately. The hypothetical limit of the value of prophylactic dissection of nodes of the neck is shown by the fact that of 128 consecutive patients with determinate cancer of the lip with no metastasis on admission, whose primary lesion was controlled for at least five years, metastasis developed later in only 4. Therefore, prophylactic dissection for the group could not have had even a theoretical value in 125 patients, whereas under the higher reported mortality rates following such dissection more than 10 per cent would have died of postoperative complications, about four times the number which the procedure could possibly have cured. In any event it probably would not have been worth while to perform one hundred and twenty-eight dissections to anticipate metastasis in 3 patients, when these 3 were cured by subsequent treatment. The trend is similar in the treatment of cancer of

the tongue and of the cheek. It appears that only about one in thirty-three prophylactic dissections for cancer of the lip can be of value, one in six for cancer of the cheek and one in eight for cancer of the tongue. As for prophylactic irradiation, it should not be assumed that one or two skin erythema doses are capable of sterilizing an impalpable focus (the actual existence of which cannot be proved) simply because the patient survives and metastasis does not develop subsequently. Theoretical and statistical evidence fails to provide any justification for prophylactic treatment of intraoral and pharyngeal cancer. Therefore, treatment should be administered only if and when the cervical nodes are involved. The treatment for clinically demonstrable cervical metastasis should be based on the clinical features of the given case rather than on any preference for a particular method. Dissection of nodes of the neck is usually suitable for squamous carcinoma of the lip of grade 1 or 2, while the highly malignant, rapidly progressing anaplastic growths of the base of the tongue or of the nasopharynx which metastasize early, bilaterally and widely throughout the neck respond favorably to irradiation. Irradiation and surgical intervention may be effectively combined during dissection of cervical nodes when a metastatic node thought to be operable infiltrates beyond its capsule into a structure which cannot be excised widely. The prognosis of cervical metastatic cancer is not hopeless. The efficacy of dissection of affected cervical nodes in 70 selected cases of early, operable and microscopically proved cancer is proved by the fact that 26 per cent of the affected patients have survived for more than five years. The data of the Memorial Hospital show that 46 patients with microscopically proved cervical metastasis treated by irradiation alone have survived for five years or more.

Repair of Hepatic Damage.—Ravdin and his associates present evidence obtained from experiments on dogs that even if glycogen storage is useful in protecting the liver from injury amounts comparable to those commonly used in man cannot be maintained over a long time by intravenous dextrose therapy. The data on man demonstrate that even in the presence of extensive injury glycogen can be deposited in the liver and low concentrations of hepatic lipid can be obtained. Specimens of liver from patients undergoing operations under spinal anesthesia for disease of the biliary tract were obtained without affecting the course of their convalescence. The data support the concept that the amount of glycogen present in the liver at any given period depends on the amount of carbohydrate or carbohydrate-forming substances available to the subject. If there is any virtue in obtaining a high concentration of hepatic glycogen this can be obtained only by supplying a sufficient number of calories during therapy. Unless more calories are provided by diet or intravenous therapy than are necessary for the energy requirements of the subject glycogen or protein will not be laid down in the liver. Such provision is not possible by any method of intravenous therapy now available. The loss of weight which nearly all such subjects experience is an expression of the extent to which the intake of food has failed to meet the energy requirements. Not only does adequate protein in the diet protect the liver from hepatotoxic agents through some inherent properties of the foodstuff itself, but protein is more efficient, in the presence of ductal obstruction, in reducing the concentration of hepatic lipid than is carbohydrate. If repair is to be facilitated protein must be available, for regeneration cannot readily take place on carbohydrate alone, especially when the protein stores of the body have been depleted by under-nutrition. Only by a fuller knowledge of the energy requirements of man, of the foodstuffs essential to meet these and of the part that they may play in conditioning injury and promoting repair can patients with hepatic injury be satisfactorily prepared for operation and convalescence.

Influence of Temperature on Wounds.—Brooks and Duncan determined the effect that temperature had on the healing of experimental wounds in dogs. Three pairs of symmetrical points on the backs of the dogs were chosen. Two of the points were subjected to the application of heat and two to the application of cold, and two were not influenced by either application. The experiments suggest that it is doubtful whether it is wise to inhibit an inflammatory reaction by the application of cold or of heat to the extremities of a patient in surgical shock. The

conditions are natural responses, and efforts to reverse normal physiologic processes bring to mind the discarded fever-reducing drugs of the past.

Infusions of Blood via Bone Marrow.—Tocantins and his co-workers report the cases of 4 patients with acute failure of the peripheral circulation which illustrate types of emergency in which the injection of blood, fluids or drugs via the bone marrow may be followed by prompt recovery. The intramedullary route is indicated whenever the direct introduction of fluids into the circulation is not possible because the veins are collapsed. The bone marrow offers the ideal site for the introduction of fluids. Since the marrow veins are surrounded by a rigid envelop, they are less likely to collapse and can probably withstand forcible injection without overdistention and leakage. Under circumstances of collapse the delay involved in locating a vein and in attempts to introduce a needle into it may jeopardize any chance of recovery. When all required equipment is available and ready it is possible to start an intramedullary infusion or injection within three minutes after the skin is penetrated by the needle. In contrast with venesection, no incision of the skin or special after-care of the wound is necessary. The method may be useful for the emergency treatment of mutilated patients or for those with extensive burns of the skin. Since the needle for bone marrow infusion, once in place, remains fixed, continuous infusion is possible while the patient is being transported. Fluid should not be injected unless marrow is clearly obtained by aspiration. Sturdy needles should be used to minimize the danger of bending or breaking.

Archives of Otolaryngology, Chicago

34:1083-1214 (Dec.) 1941

- Ménière's Disease: Addenda to Medical Therapy. A. C. Furstenberg, G. Richardson, Ann Arbor, Mich., and F. D. Lathrop, Boston.—p. 1083.
 Prophylaxis of Common Cold. T. E. Walsh, St. Louis.—p. 1093.
 Physical Rehabilitation of the Laryngectomized Patient. W. Morrison, New York.—p. 1101.
 Tumors of Larynx Other Than Squamous Cell Epithelioma. F. Z. Havens and Edith M. Parkhill, Rochester, Minn.—p. 1113.
 Allergic Rhinitis: Analysis of 128 Cases in Which Rhinologist and Allergist Collaborated. F. D. Woodward and O. Swineford, Charlottesville, Va.—p. 1123.
 Use of Iodized Oil in Treatment of Infections of Nasal Antrum. H. M. Goodyear, Cincinnati.—p. 1133.
 Primary Pseudocholesteatoma of Ear. K. M. Day, Pittsburgh.—p. 1144.
 Diagnosis of Allergy of Nose and Paranasal Sinuses, with Particular Attention to Atypical Types. F. K. Hansel, St. Louis.—p. 1151.
 Review of Allergy for 1940. W. W. Duke, Kansas City, Mo., and F. L. MacQuiddy, Omaha.—p. 1178.

Cancer Research, Baltimore

1:849-918 (Nov.) 1941

- Carcinogenesis in Mouse's Skin by Infrequent Application at Long Intervals of Methylcholanthrene. W. Cramer and R. E. Stone, St. Louis.—p. 849.
 Further Study of Blastomogenic Substances in Human Body. K. E. Kleinenberg, S. A. Neufach and L. M. Schabad, Leningrad, Soviet Union.—p. 853.
 Mechanism of Action of Carcinogenic Substances. L. T. Larionov, Leningrad, Soviet Union.—p. 860.
 Artificial Benignancy of Neoplasms: VI. Observations on Oxidative Behavior of Tumors, Artificially Benign Tumors and Homologous Normal Tissues. F. N. Craig, A. M. Bassett and W. T. Salter, Boston.—p. 869.
 Influence of Sex of Mice on Acquired Resistance to Transplantable Sarcoma. L. Gross, Cincinnati.—p. 880.
 Comparison of X Zone of Adrenal Cortex in Two Inbred Strains of Mice. W. Daughaday, Bar Harbor, Maine.—p. 883.
 Genetic Analysis of Induction of Tumors by Methylcholanthrene: III. Local and Remote Induction of Carcinoma of Mammary Gland. L. C. Strong and W. L. Williams, New Haven, Conn.—p. 886.
 Effect of Heredity on Susceptibility of Rats to Implants of Induced Sarcoma. J. L. Orshon, H. A. Davenport, F. B. Queen, D. D. Spicer and R. M. Galt, Chicago.—p. 891.
 Relationship of Twins, Teratomas and Ovarian Dermoids. H. W. Edmonds and J. W. Hawkins, Boston.—p. 896.
 Incidence of Carcinoma of Lung. B. Halpert, New Orleans.—p. 903.
 Prevention of Cancer of Vulva. F. J. Taussig, St. Louis.—p. 901.

Relationship of Twins, Teratomas and Ovarian Dermoids.—Edmonds and Hawkins investigated the occurrence of twins in the families of patients with dermoids (childhood teratomas and ovarian dermoids) and in an appropriate number of control families. The material of the study consisted of 50 consecutive patients with ovarian dermoids, 50 hospitalized for twin pregnancy and 40 hospitalized for single pregnancy. The incidence of twins in these families was determined by the presence or absence of twins in blood relatives and the total

number of twin births, the total number of single births and the rate of twin births per thousand total births. There were twins in the families of 28 of the 50 patients with ovarian dermoids, in the families of 30 of the 50 women hospitalized for twin pregnancy and in the families of 16 of the 40 women hospitalized for a single pregnancy. The twin pregnancy rate per thousand births is respectively 22, 18 and 5.3 for patients with dermoids, twin pregnancy and single pregnancy. The incidence of families with twins in a teratoma and in a control series was 83 and 34 per cent, or nineteen of twenty-three and seventeen of fifty families studied. The twin pregnancy rate per thousand births for the teratoma and control series is 21 and 12 for the sibship of the propositus and 18 and 11 for the sibships of parents. It is seen that the twin birth rates obtained for the twin pregnancy series, for the ovarian dermoid series and for the childhood teratoma series are all similar and are all much in excess of the rate for the controls. This evidence suggests that factors of heredity similar to those conditioning twinning may also condition the occurrence of ovarian dermoids and of teratomas of children. It favors the idea that these conditions are at least partly alike in the mode of their formation. This evidence supports a theory that the incidence of teratomatous tumors and of twins may be influenced by the same hereditary factors.

Carcinoma of Lung.—Halpert states that a survey of the records and material of the department of pathology of the University of Chicago disclosed that during the last decade 74 carcinomas of the lung were discovered at necropsy in 2,781 persons more than 1 year old. Carcinoma of the lung was more than half as frequent as carcinoma of the stomach and more frequent than carcinoma of the biliary system and carcinoma of the pancreas together. The data support the assertion that carcinoma of the lung is becoming the second, if not the first, most common malignant neoplasm in the male. Fifty-nine of the 74 carcinomas were in men between 31 and 80 years of age.

Cancer of Vulva.—During the last thirty-five years Taussig has observed 161 cases of cancer of the vulva. The chief important etiologic conditions in cancer of the vulva appear to be urethral caruncle, senile warts, abscess of Bartholin's gland, syphilis and leukoplakia. This points to certain preexisting lesions which tend to become malignant. Removal of these preexisting lesions if done promptly may appreciably lower the incidence of cancer of the vulva.

Journal of Nutrition, Philadelphia

22:541-642 (Dec.) 1941. Partial Index

- Studies on Nutritional Achromotrichia in Rats. K. Unna, Grace V. Richards and W. L. Sampson, Rahway, N. J.—p. 553.
Inefficacy of Hormones in Nutritional Achromotrichia of Rats. C. W. Mushett and K. Unna, Rahway, N. J.—p. 565.
*Digestibility and Biologic Value of Whole Wheat Breads as Compared with White Bread. J. R. Murlin, Margaret E. Marshall and C. D. Kochakian, Rochester, N. Y.—p. 573.
*Apparent Digestibility of Carbohydrates, Fats and "Indigestible Residue" in Whole Wheat and White Breads. R. R. Sealock, D. H. Basinski and J. R. Murlin, Rochester, N. Y.—p. 589.
Dark Adaptometer and Blood Vitamin A Measurements in North Carolina Nutrition Survey. M. E. Yarbrough and W. J. Dann, Durham, N. C.—p. 597.
Relative Assimilation of Fluorine from Fluorine Bearing Minerals and Food (Tea), and from Water and Food. Margaret Lawrenz and H. H. Mitchell, Urbana, Ill.—p. 621.

Digestibility and Biologic Value of Whole Wheat and White Bread.—Murlin and his associates determined the biologic value of the proteins and their digestibility in 10 men. The results are applicable to the current national problems in nutrition. The diet was planned to supply, as nearly as possible, 80 per cent of the food nitrogen from whole egg and 80 per cent from bread in alternate periods of six days each. Approximately 10 per cent of the nitrogen was contained in butter and cream and 10 per cent in fruits, vegetables and accessories. A rather high fat diet was necessary to supply sufficient energy without excessive bulk or too much sweetness. The average daily intake was 2,914 kilogram calories. Four whole wheat and three white breads were compared. In general, the whole wheat breads gave lower true digestibility values for protein than the white breads but at the same time produced higher biologic values. When the biologic value of egg proteins was taken as

100 per cent the biologic values for the proteins of the four whole wheat breads were: for a whole wheat cereal biscuit, 81.6; for a whole wheat bread containing 5 per cent nonfat milk solids, 77.8; for a "peeled wheat" bread eaten with extra B vitamins, 79.6; for a "peeled wheat" bread made with high vitamin yeast but eaten with no extra vitamins, 81, and for the same bread baked with ordinary yeast and eaten with no extra B vitamins, 77.9. For the white breads the figures were: for one type of lean white bread eaten with the same extra B vitamins as were eaten with the "peeled wheat" bread, 75.3; for a similar lean white bread eaten with no extra B vitamins, 74.6; for white bread containing 5 per cent nonfat milk solids and baked with a high vitamin yeast but eaten with no extra B vitamins, 79.8. The authors point out that the eating of the peeled wheat bread instead of the lean white bread with extra B vitamins would result in a saving of 93,737 kilogram calories, or enough to support the average person (at 2,200 calories a day) for more than forty days. If the average person in the United States who now eats lean white bread were to change to an acceptable whole wheat bread not only would this large saving per capita in calories result but each person would consume the entire B complex of vitamins contained in wheat and more minerals (especially calcium, phosphorus and iron), and his tissues would have the advantages of a biologic value of protein significantly higher than that of lean white bread. These considerations are all important. The country is aware of the importance of better nutrition, and it should become aware of the importance of vital economy in nutrition.

Digestibility of Carbohydrates, Fats and Residue in Bread.—Sealock and his colleagues compared the availability of nutrients in whole wheat, peeled wheat and white bread. One of the chief differences between white and whole wheat bread is the higher content of "indigestible residue" in the latter. The apparent digestibility of carbohydrates varied from 97.6 to 99.8 per cent and of fat from 95.7 to 97.4 per cent. There was no significant difference between the results obtained with white and those with whole wheat bread. The higher "indigestible residue" of whole wheat biscuit and bread did not interfere with the digestion and absorption of carbohydrate and fat. The "indigestible residue" exhibited an apparent digestibility of 29.2 to 76.3 per cent. Although there was considerable variation in the percentage of minerals absorbed, with the exception of the periods when egg and a whole wheat cereal biscuit were consumed, a striking uniformity of mineral intake occurred.

Journal of Pharmacology & Exper. Therap., Baltimore

73:229-362 (Nov.) 1941. Partial Index

- Respiratory Effects of Morphine, Codeine and Related Substances: Parts VIII to XI. Margaret Sumwalt, H. R. Oswald, C. I. Wright, A. T. Miller and H. A. Lusk.—p. 229.
Changes in Susceptibility to Convulsant Action of Metrazol. J. Sacks and N. M. Glaser, Ann Arbor, Mich.—p. 289.
Actions of Curarizing Preparations in the Human. A. M. Harvey and R. L. Masland, Philadelphia.—p. 304.
Studies on Series of New Triazole Derivatives. R. W. Cunningham, E. J. Fellows and A. E. Livingston, Philadelphia.—p. 312.
Effect of Calcium and Strontium Salts on Action of Sodium Pentobarbital. Versa V. Cole, Philadelphia.—p. 335.
Mode of Action of Sulfonamides: I. Action on Escherichia Coli. H. I. Kohn and J. S. Harris, Durham, N. C.—p. 343.

New England Journal of Medicine, Boston

225:889-928 (Dec. 4) 1941

- Why First Aid? A. W. Reggio, Boston.—p. 889.
Cardiovascular Aspects of Aviation Medicine. J. R. Poppen, Washington, D. C.—p. 892.
*Suppurative Pericarditis. R. Adams and H. Polderman, Boston.—p. 897.
Activities of Boston Health Department. G. L. Gately, Boston.—p. 902.
Spontaneous Mediastinal Emphysema. C. W. Styron, Boston.—p. 908.
Ovulation. J. Rock, Brookline, Mass.—p. 910.

Pericarditis.—Adams and Polderman performed pericardiotomy in 3 patients with purulent pneumococcal pericarditis. One of the patients recovered. They believe that for this patient the pericardiotomy was a life-saving procedure but that it probably would have failed without the aid of immune serum, chemotherapy, transfusions and excellent nursing care. In the other 2 patients drainage of 500 cc. of thick pus from 1 and of 400 cc. from the other patient may have resulted in temporary

improvement, but the procedure failed to change the progressive course of the disease. Both patients illustrate the progressive decline of the general condition that often typifies patients with pneumococcal pericarditis, even after drainage, before the advent of chemotherapy and immunotherapy. Four other patients with pneumococcal pericarditis died without operation. Of 9 patients with pericarditis due to *Staphylococcus aureus*, 3 had an operation and 1 of these recovered. Pericardial drainage, the authors believe, was without question a life-saving procedure for this patient. Although drainage of the pericardial cavity was adequate in the 2 other patients operated on, infection elsewhere was too severe and extensive for recovery to occur. Three patients with streptococcal pericarditis died; operation was not performed in this group. The condition of 1 of these patients illustrates that signs of pericardial effusion can be produced by a small quantity of fluid; only 100 cc. was found at necropsy. Inability of the pericardium to dilate owing to preceding inflammatory fixation in association with empyema was the probable explanation. One patient with an influenza bacillus infection survived after pericardiectomy. The infection in 12 of the 20 patients was preceded by pneumonitis or pneumonia, in 6 by osteomyelitis, in 1 by cholecystitis and in 1 by mastoiditis. In 5 of the patients with staphylococcal pericarditis an abscess was found in the heart muscle; electrocardiographic studies in such patients may be of diagnostic aid.

Oklahoma State Medical Assn. Jour., Oklahoma City 34:511-556 (Dec.) 1941

- Thiocyanates in Treatment of Hypertension. W. T. Bynum, Chickasha.—p. 511.
Mental Hygiene in Our Public Schools. F. M. Adams, Vinita.—p. 517.
Diphtheria of Middle Ear. W. F. Keller, Oklahoma City.—p. 519.
Multiple Intestinoenteric Fistulas Following Precipitate Labor: Report of Case. G. Penick and J. M. Parrish, Oklahoma City.—p. 521.
Study of Compound Fractures. A. L. Swenson, Oklahoma City.—p. 524.

Philippine Medical Association Journal, Manila 21:481-534 (Oct.) 1941

- Some Outstanding Achievements in Malaria Research During Last Twenty Years. C. M. Africa and F. J. Dy, Manila.—p. 481.
Rationale of Popular Uses of Philippine Medicinal Plants. F. Garcia, Manila.—p. 487.
Studies on Spontaneous Pneumothorax. P. Ignacio and A. Gonzales, Kawit.—p. 495.
Noma in Philippines. E. Stransky and L. V. Pecache, Manila.—p. 501.
Rupture of Uterus Incident to Hydrocephalus and Contracted Pelvis. C. V. Bagabaldo and D. A. Garcia, Tacloban.—p. 509.

Psychoanalytic Quarterly, Albany, N. Y. 10:513-708 (Oct.) 1941

- Critical Analysis of Elements of Psychic Functions: Part I. C. M. Herold, New York.—p. 513.
Status of Emotions in Palpitation and Extrasystoles with Note on "Effort Syndrome." M. L. Miller and Helen V. McLean, Chicago.—p. 545.
Physiology of Behavior and Choice of Neurosis. T. M. French, Chicago.—p. 561.
Micropsia. L. H. Bartemeier, Detroit.—p. 573.
Successful Treatment of Case of Acute Hysterical Depression by Return Under Hypnosis to Critical Phase of Childhood. M. H. Erickson, Eloise, Mich., and L. S. Kubie, New York.—p. 583.
Predisposition to Anxiety: Part II. Phyllis Greenacre, New York.—p. 610.
Negative Reactions to Christmas. J. Eisenbud, New York.—p. 639.

Public Health Reports, Washington, D. C. 56:2321-2364 (Dec. 5) 1941

- Facilities in United States for Special Care of Children with Rheumatic Heart Disease. O. F. Hedley.—p. 2321.
Siphonaptera: Genera *Amphalius* and *Ctenophyllus* in North America. W. L. Jellison.—p. 2341.

Southwestern Medicine, El Paso, Texas 25:345-380 (Nov.) 1941

- Pneumonia Control in New Mexico (1940-1941). C. H. Douthirt, Santa Fe, N. M.—p. 345.
Common Skin Disease: Dermatitis Venenata and Acne Vulgaris. R. L. Sutton Jr., Kansas City, Mo.—p. 348.
Cutaneous Manifestations of Syphilis. H. D. Newton, San Diego, Calif.—p. 351.
Permission Necropsy: Its Purpose and Problems. O. T. Schultz, Evanston, Ill.—p. 353.
Effects of Electromagnetic Radiations on Flocculation Tests for Syphilis. E. L. Breazeale, Tucson, Ariz.—p. 362.

Surgery, St. Louis

10:861-1042 (Dec.) 1941

- Mechanisms of Gastric Secretion. A. C. Ivy, Chicago.—p. 861.
Management of Gastric Resection for "Poor Risk" Patient. H. McCorkle and H. G. Bell, San Francisco.—p. 879.
Hemangioma of Stomach: Review of Literature and Report of Two Cases. C. B. Morton and R. E. Burger, University, Va.—p. 891.
Abscess of Stomach Wall: Report of Case. P. K. Sauer and J. R. Lisa, New York.—p. 899.
*Zinc Peroxide in Treatment of Compound Fractures and Traumatic Amputations: Report of Eighteen Cases. E. J. Pulaski and B. H. Chandlee, Philadelphia.—p. 904.
Treatment of Fractures in Neck of Humerus Without Immobilization. E. O. Geckeler, Philadelphia.—p. 917.
Tibial Epiphysiotomy for Severe Genu Recurvatum. R. Sutherland, Los Angeles, and M. J. Rowe Jr., Long Beach, Calif.—p. 927.
*Blastomycosis of Bone: Review of Sixty-Three Collected Cases of Which Six Recovered. R. R. Jones Jr. and D. S. Martin, Durham, N. C.—p. 931.
*Systemic Blastomycosis: Report of Case with Unusual Immunologic Findings, Well Two Years After Onset. D. S. Martin and R. R. Jones Jr., Durham, N. C.—p. 939.
*Local Sulfanilamide Therapy in Surgical Infections. J. R. Veal and R. G. Klepper, Washington, D. C.—p. 947.
Changes Produced by Sympathectomy in Electrical Resistance of Skin. C. P. Richter and Bettye G. Woodruff, Baltimore.—p. 957.
Nephrolithiasis Due to Infection with *Bacillus Proteus*. C. D. Creevy, Minneapolis.—p. 971.
Extradural Hemorrhage in Posterior Fossa. C. C. Coleman and J. L. Thomson, Richmond, Va.—p. 985.
Experimental Studies on Alimentary Azotemia: II. Relative Importance of Plasma and Erythrocyte Fractions of Absorbed Blood. H. N. Harkins and C. F. Chunn, Detroit.—p. 991.
Repair of Large Umbilical Hernia. E. Michelson and W. Raffel, Baltimore.—p. 999.

Zinc Peroxide in Treatment of Fractures and Amputations.—Pulaski and Chandlee review recent literature on the treatment of traumatic amputations and compound fractures and present results obtained with zinc peroxide in eighteen such wounds. They suggest that all tissue debrided from open traumatic injuries be cultured aerobically and anaerobically. The eighteen wounds were sustained in street or industrial accidents, and all the patients were seen within three hours after injury. On the patient's arrival in the emergency ward, the wound was covered with several layers of an alcohol dressing and the injured limb was placed in a splint. Tetanus (1,500 units) and gas bacillus (3,500 units) antitoxins were given. Bleeding vessels were clamped. Shock therapy was instituted if indicated and immediate blood grouping for transfusion done. In the operating room, the patient was anesthetized and after the wound had been thoroughly cleansed the compound fracture was reduced. Fragments of bone were retained by internal fixation or by traction with wire. The wound (whether a compound fracture or a traumatic amputation) was then flooded with a freshly prepared suspension of active zinc peroxide in sterile distilled water. All the recesses of the wound were filled. The wound was then covered with cotton soaked in the zinc peroxide suspension, and this in turn was covered with cotton soaked in water and sealed with several layers of fine-meshed gauze impregnated with petrolatum or zinc ointment. The wounds of 13 patients were left open and treated with zinc peroxide; no infection developed. Hemolytic streptococci were cultured from the fragments of debrided tissue from five of the wounds, nonhemolytic anaerobic streptococci from three and *Clostridium welchii* from two. *Staphylococci* were present in conjunction with these organisms in every wound. In 1 patient the wound was left open and treated with 10 per cent mercurochrome and compresses of boric acid. An infection yielding hemolytic streptococci developed, but with the change to zinc peroxide applications it cleared rapidly. In 4 patients the wounds were closed after débridement and reduction; each wound became infected. Preliminary culture of material from three of these wounds yielded hemolytic streptococci from one, hemolytic streptococci and an aerobic nonhemolytic streptococcus from one and *Bacillus anthracis* from one. Cultures were not made of material from the fourth wound. After the wounds were opened and treated with zinc peroxide the infections cleared promptly. There were 3 deaths; 2 were of men more than 70 and were attributed to uncontrollably severe shock and myocardial failure. The third death occurred twenty-four days after the accident and was due to a hemolytic streptococcus, cerebrospinal meningitis and pneumonia. Sulfanilamide and sulfapyridine were not effective. The wounds of all 3 of

these patients were healing at the time of death. In 23 "control" patients with comparable wounds not treated with zinc peroxide the incidence of infection was 21.8 per cent.

Blastomycosis of Bone.—Jones and Martin collected 62 cases of blastomycosis of bone from the literature; 6 of the patients recovered after treatment, 3 were not followed sufficiently long to determine the end result and 53 died of the disease. They summarize the knowledge of this infection and outline certain studies valuable in the diagnosis, prognosis and treatment of the disease. In bone the infection may be localized or diffuse osteomyelitis, periostitis or, if a joint is involved, arthritis. The isolation and identification of *Blastomyces dermatitidis* from infected secretions or exudates is proof of infection and should always be attempted. However, as examination of tissue and culture are time consuming the authors believe these should be deferred until the patient's allergic reaction has been determined by cutaneous tests and by the complement fixation test they describe. The proportions of material and reagents for the complement fixation test specific for *B. dermatitidis* are the same as are used for the Wassermann test except that a fungus suspension is substituted for the beef heart antigen. Roentgenograms of the chest should be obtained from all patients suspected of having the infection, as the lungs are the most common port through which the fungus enters. Roentgenograms may also be made of any bone thought to be involved, particularly of the spine of the patient who complains of backache. When multiple osseous lesions exist a roentgen diagnosis of blastomycosis can be suspected. Well localized, sharply defined destructive processes in the metaphyses, when multiple, suggest blastomycosis rather than the other conditions. General hygienic measures are of first therapeutic importance. Bed rest and an adequate diet are essential. Therapy with potassium iodide is best deferred until the diagnosis has been established and the patient's allergic status has been determined, and if the patient is sensitive he should be partially desensitized to *Blastomyces* before iodide medication or surgical intervention is undertaken. Open drainage of abscesses, curettage of ulcers or sinuses and sequestrectomy may be necessary at times, but they should not be done until partial desensitization has been accomplished and iodides have been administered. When involvement of the bones of the foot and of the ankle is extensive the generalized nature of the infection should be kept in mind and amputation used only as a last resort. Potassium iodide was given to the 6 patients who recovered; 3 received heliotherapy also, 2 were given *Blastomyces* vaccine and 1 received roentgen therapy. All these additional measures were thought to be beneficial. The prognosis of blastomycosis of bone is poor, especially in persons who have a high titer of complement fixing antibodies.

Systemic Blastomycosis.—Martin and Jones report a case of blastomycosis with an immunologic picture so different from the usual that a radical departure from the usual treatment was necessary. The case is that of a white farmer of 30 admitted to the Duke Hospital. He complained of pain in the left elbow and forearm of six weeks' duration. Eleven weeks before admission to the hospital the patient noticed a small area of tenderness over the left eleventh rib. Three weeks later a small swelling appeared; this was incised by his physician, and a small amount of sterile pus was evacuated. The exposed rib was curetted, and the wound has remained as an indolent cavity. Six weeks before hospitalization a swollen, tender spot developed over the left ulna just distal to the elbow joint. This swelling increased in size for about ten days. Movement of the elbow caused pain. Ten days before hospitalization this area was incised and some necrotic bone was evacuated. The pus from this wound was reported as showing no growth of pyogenic organisms. Both wounds continued to drain, and the elbow remained painful. The patient, with no evidence of hypersensitivity to *Blastomyces*, did not respond to iodide therapy. During the six weeks that the drug was administered he continued to have a low grade fever and failed to gain significantly in weight, and the local lesion at the elbow became worse. The appearance of the fungus in smears suggested either a different form of the fungus or a peculiar reaction of the host cells to the fungus. A positive Foshay reaction further suggested that the fungus was producing some antigenic substance which may have masked or prevented the development of a cutaneous reaction to the intracutaneous injection of a vaccine or a filtrate of the organism.

A severe local reaction around the elbow following the intracutaneous injection of 0.1 cc. of undiluted anti-*Blastomyces* rabbit serum emphasized that the production of a hypohypothetic antigenic material was most intense in this area. The apparent benefit following the injection of 2.4 cc. of immune serum, with a complete reversal of the immunologic picture, was interpreted as meaning that this excess material was neutralized by the antibodies in the rabbit serum, allowing the host's cells, aided by iodides, to attack the invading fungi. The observation that the reaction to the complement fixation test became more strongly positive three weeks later suggested that the patient had previously built up a certain resistance to the fungus but that evidences of the resistance were masked by the local production of the soluble antigen. This substance may have prevented local healing and reversed the usual signs of hypersensitivity to the fungus and the presence of serum antibodies. The mild allergy that developed after serum treatment did not seem sufficient to warrant the withdrawal of iodide therapy. The success in the ultimate cure of this patient of maggot therapy was felt to be due entirely to the action of the maggots in removing necrotic tissue and keeping the sinuses open for drainage.

Sulfanilamide Therapy in Surgical Infections.—During the last year Veal and Klepser treated more than three hundred infected wounds (postoperative wound infections, traumatic wounds, infected burns, compound fractures, leg ulcers, decubital ulcers, localized abscesses and carbuncles) by the local implantation of sulfanilamide powder. Cultures were made of material from many of the wounds before local treatment was begun and at intervals during treatment. Biopsies also were made of the edges of the wounds of 70 patients. The wounds were treated by adequate drainage or débridement and the local implantation of sulfanilamide powder. Sufficient powder was used to cover the surface of the wound and to fill all pockets. All types of organisms were affected. If the sulfanilamide was applied daily, the number of bacteria diminished until the wound was practically sterile after five to eight days of treatment. With the reduction in bacteria the amount of exudate decreased. The necrotic odor of some of the wounds vanished immediately. After the bacterial growth and exudate were controlled sulfanilamide was withdrawn. Some wounds remained clean, and healing progressed steadily. In others there was a bacterial regrowth with a return of inflammation requiring the resumption of the daily instillation of the sulfanilamide powder. The resumed therapy controlled the infection, but the granulation tissue appeared dry, anemic and indolent, and healing was retarded. After several trials, the application for a few days of an ointment of 10 per cent sulfanilamide with 2 per cent allantoin in an absorbable glycerinated base caused the tissue to become active and healthy and kept the infection under control. The authors' routine now is as follows: As soon as bacterial growth and the exudate have diminished and the inflammation has subsided, the daily application of powdered sulfanilamide is replaced by the daily application, over the entire lesion, of a thin layer of the sulfanilamide-allantoin ointment covered with a dry gauze dressing. Systemic toxic reactions or the cyanosis seen so frequently after the oral or the parenteral administration of sulfanilamide was not observed in the patients treated locally. However, there was a cumulative rise of the level of sulfanilamide in the blood in certain patients given large daily doses over a long time.

Wisconsin Medical Journal, Madison

40:1013-1128 (Nov.) 1941

- Triumphs of Optimism. N. B. Van Eppen, New York.—p. 1031.
Anatomic and Physiologic Aids in Neurologic Diagnosis. D. Cleveland, Milwaukee.—p. 1037.
Tuberculosis Case Finding in Industry. O. A. Sander, Milwaukee.—p. 1042.
Sulfanilamide and Its Derivatives in Treatment of *Escherichia Coli* Septicemia: Report of Case with Recovery. M. L. Carns and R. B. Larsen, Madison.—p. 1046.
Sciatica. V. J. Hittner, Seymour.—p. 1048.
Some Common Everyday Injuries of Knee Joint. K. Speed, Chicago.—p. 1051.
Fractures About Wrist. H. L. Greene, Madison.—p. 1055.
Fractures About Ankle. W. P. Blount, Milwaukee.—p. 1058.
First Aid Treatment of Fractures. H. C. Schumm, Milwaukee.—p. 1061.

FOREIGN

An asterisk (*) before a title indicates that the article is abstracted below. Single case reports and trials of new drugs are usually omitted.

British Journal of Experimental Pathology, London

22:241-292 (Oct.) 1941

- Studies on Experimental Goiter: I. Effect of Brassica Seed Diets on Rats. T. H. Kennedy and H. D. Purves—p. 241.
 Id. II. Changes in Anterior Pituitary of Rat, Produced by Brassica Seed Diet. W. E. Griesbach—p. 245.
 Id. III. Effect of Goitrogenic Diet on Hypophysectomized Rats. W. E. Griesbach, T. H. Kennedy and H. D. Purves—p. 249.
 Purification of Diphtheria Toxin and Toxoid Made from Tryptic Digest Broths. F. V. Linggood—p. 255.
 Changes in Lung Following Injections of Iodized Oil into Trachea. F. J. S. Gower and J. R. Gilmour—p. 262.
 Weil-Felix Reaction in Experimental Rat Bite Fever. S. R. Saylor and R. Lewthwaite—p. 274.

British Journal of Ophthalmology, London

25:553-594 (Dec.) 1941

- Cataract Extraction in Refractory Patients and Operative Treatment of Iridodiolysis. T. G. W. Parry—p. 553.
 Vitamin B Complex Deficiency as Cause of Retrobulbar Neuritis and Peripheral Neuritis in Chronic Alcoholic and Pipe Smoker. B. Gottlieb—p. 556.
 Monocular Diplopia Occurring in Cases of Squint. E. E. Cass—p. 565.

Edinburgh Medical Journal

48:713-792 (Nov.) 1941

- *Chordoma. W. F. Harvey and E. K. Dawson—p. 713.
 Dietetic Treatment of Gastrointestinal Disease. D. M. Dunlop—p. 731.
 Hypertensions. A. R. Gilchrist—p. 752.

Chordoma.—Harvey and Dawson report a microscopic study of 14 cases of chordoma and of 5 of doubtful chordoma encountered through examination of 16,000 slides of tumors. The entity is probably more frequent than is realized but is still rare. Chordoma is said to be the only tumor reproducing in its neoplastic proliferation a purely embryonic tissue. Chordomas arise anywhere in the vertebral column, from the region of the sphenoid-occipital synchondrosis to the tip of the coccyx. Available figures show that most of them arise in the basis cranii and the sacrococcygeal region; that is, at the two ends of the notochord. There is a group of retroperitoneal or sacrococcygeal tumors which clinically and macroscopically resemble chordoma and which microscopically show fields of morphologic identity with chordoma but which at the same time show puzzling fields of glanduliform or organoid epithelial structure. The typical chordoma is translucent, gelatinous and lobulated with areas of hemorrhage. A characteristic feature is the destruction and infiltration of bone. In its more gross microscopic appearance it is a lobulated tumor with solid or partially solid alveolar cell character. The dense fibrous trabecular septums which divide the lobules are not always complete; they carry the nutrient vessels of the tumor, for the tumorous areas of cells are apparently avascular. The mucinous character of the chordoma is the main diagnostic feature. Parts of the tumor, instead of showing the more typical epithelioid cell, may show a compressed fusiform type of cell suggesting sarcoma. Some of the tumors observed by the author, however, showed transition from the epithelioid type of cell to a fusiform cell with no suggestion of sarcoma. The chordomatous "sarcoma" chiefly involves the concepts of a mesodermal origin for the notochord and a microscopic picture of fusiform cells and mitoses. Occasionally the malignant chordoma may adopt a carcinomatous or a sarcomatous character, expressed as chordocarcinoma and chordosarcoma. The benign chordoma and the echordosis malformation may be regarded as one and the same type of new growth. In the malignant chordoma many of the generally accepted malignant criteria are frequently absent, but the tumor may show cellularity, pleomorphism and mitoses. Metastasis occurs rarely, and growth, though infiltrating and destroying bone, is slow. Recurrence after excision is invariable, and, even though survival may be long, few if any patients have remained cured after complete removal.

Lancet, London

2:549-586 (Nov. 8) 1941

- Renal Lesions in Two Cases of Crush Syndrome. J. S. Dunn, Marjorie Gillespie and J. S. F. Nixon—p. 549.
 *Trinitrotoluene Jaundice. R. M. Evans—p. 552.
 *Improved Webster Test for Trinitrotoluene Derivative in Urine. J. Ingham—p. 554.
 Trigeminal Neuralgia: Suggested Basis of Treatment. W. E. Adams and W. Robinson—p. 555.
 Influence of Menstruation on Suspension Stability of Red Cells. R. Greene—p. 556.
 Concentrated Serum in Head Injuries. J. W. A. Turner—p. 557.
 Hemothorax from Leakage of Dissecting Aortic Aneurysm: Survival. F. Post—p. 558.
 Pterygonuchal Infantism (Turner's Syndrome): Case, with Post-mortem Findings. E. P. Sharpey Schafer—p. 559.
 Cerebrospinal Fever with Low Blood Pressure. J. Sharkey—p. 560.
 Postvaccinal and Measles Encephalomyelitis: Report on Two Cases Which Recovered. A. H. G. Burton and J. H. Weir—p. 561.
 Encephalitis of Unknown Origin. H. A. Palmer—p. 562.

Trinitrotoluene Jaundice.—Evans observed 7 patients employed in an ordnance filling factory who had toxic jaundice apparently caused by trinitrotoluene. The disorder is not uncommon under the present war conditions, and early diagnosis and treatment are essential. The jaundice occurred within six months of the patients' beginning employment at the factory, and 1 of the 2 patients who died had been in contact with explosives for only three weeks when symptoms appeared. Six of the patients were women; they had no history of toxemia of pregnancy. The jaundice produced a typical orange yellow pigmentation. The associated symptoms were nausea, anorexia and epigastric discomfort. Hepatic enlargement and pyrexia were absent. This fact distinguishes the condition from catarrhal jaundice, with which it may be confused. Necropsy of the patients who died revealed acute yellow atrophy of the liver and hyperplasia of the bone marrow in 1 patient and subacute hepatic necrosis and hyperplasia of the bone marrow in the other (whose death was due to aplastic anemia). Treatment consisted of administering dextrose, insulin and vitamin C and symptomatic measures. Prophylaxis is important, the main measures being protection of the skin, washing, adequate ventilation of factories, a healthy life and a full diet.

Improved Webster Test for Trinitrotoluene in Urine.—Ingham points out that the sensitivity of the Webster test for trinitrotoluene is enhanced and a positive result obtained more frequently when the mixture of urine and sulfuric acid is boiled before ether is added and four times as much urine as Webster recommends is used. With these modifications the test is sensitive to 1 part of trinitrotoluene in 10,000 parts of urine. Anthraquinone derivatives are not excluded, but these are pinker. For the daily examination of workers in factories the technic may be simplified as follows: Two ordinary test tubes (7 by $\frac{3}{4}$ inch), a Bunsen burner or a spirit lamp, a 20 per cent (by volume) solution of sulfuric acid, ordinary (methylated) ether and a 5 per cent alcoholic solution of potassium hydroxide (freshly prepared) are required. About 10 cc. of urine is placed into one test tube, and the same amount of the sulfuric acid is added; the tube is shaken, and the solution is brought to a boil over the burner; then the tube is cooled thoroughly under the water tap. When it is cold, about 10 cc. of ether is added; the solution is shaken well and allowed to stand until ether floats to the top. Some of the supernatant ether is poured into the other test tube, and about 2 cc. of the potassium hydroxide solution is added. A dirty reddish purple develops at once if trinitrotoluene is present; the tint varies from faint to deep according to the amount of trinitrotoluene present, appears quickly and fades quickly. If trinitrotoluene is not present the resulting and persisting color is light brown.

Medical Journal of Australia, Sydney

2:555-582 (Nov. 15) 1941

- Cholelithiasis (Latent and Active). H. C. R. Darling—p. 555.
 Problems in Therapy of Ulcerative Granuloma. K. V. Earle—p. 573.
 Endocrine Causes of Disorders of Menstruation and Bleeding from the gravid Uterus. S. D. Meares—p. 566.
 Collapse and Renal Failure. J. W. Trench—p. 579.

Schweizerische medizinische Wochenschrift, Basel**71:1085-1108 (Sept. 20) 1941. Partial Index**

- *Primary Tuberculosis of Adults. P. Bernoulli.—p. 1087.
- *Problem of Harmless Cleansing of Skin. W. Burckhardt.—p. 1097.
- Use of Vitamin B₂ in General Practice. L. Mosonyi.—p. 1098.
- First Phase of Evolutive Cycle of Plasmodium in Vertebrates. B. Galli-Valerio.—p. 1099.
- So-Called Silicosis (by Talcum) of Dressmakers. L. Carozzi.—p. 1100.

Primary Tuberculosis of Adults.—Bernoulli points out that primary tuberculous infection in adults is not as rare as was formerly assumed. Histories of 3 young soldiers in whom primary tuberculosis took an unfavorable course are presented. The first soldier, aged 21, contracted a cold after four months of active service. He exhibited from then on occasional subfebrile temperatures; six weeks later he had vascular disturbances in the right leg and headaches and a month later died of tuberculous meningitis. Necropsy disclosed a fresh caseous primary focus in the lower left pulmonary lobe, caseous tuberculosis of lymph nodes and a sparse miliary dissemination in several organs. The second young man, aged 22, exhibited influenza-like symptoms a few days after discharge from active service. After an undisturbed interval of seven weeks febrile symptoms recurred, and the patient died within a few weeks with symptoms of tuberculous meningitis. Postmortem examination revealed that a miliary dissemination originated in a fresh caseating tuberculous primary complex in the left lower pulmonary lobe. In the third soldier, aged 21, the onset was also influenza-like. This was followed by progressive, predominantly left sided pulmonary tuberculosis which terminated in death six months later. Necropsy demonstrated a cavernous primary focus in the upper lobe of the left lung, extensive caseous tuberculosis of lymph nodes and tuberculous dissemination in various organs. Primary infection has in these 3 men developed in adult life. It is probable that it took place in the course of military service, although there are no conclusive proofs for this supposition.

Harmless Cleansing of Skin.—Burckhardt discusses the role of alkaline substances in the pathogenesis of eczemas. He reports results of experimental patch tests and observations on patients with eczema which demonstrate that in eczema caused by soaps the offensive substance is not the perfume but always the alkali. This observation, made by investigators in different countries, induced a search for neutral skin cleansers to replace alkaline soaps. The author describes the properties of, the tolerance for and clinical experiences with a skin cleanser the active constituents of which are fat alcohol sulfonates. This substance is effective and harmless. It is helpful in preventing eczema, particularly in persons whose skin is hypersensitive to alkali and whose occupation involves frequent cleansing of the hands.

71:1145-1168 (Oct. 4) 1941

- The Youth of Paracelsus. H. Fischer.—p. 1145.
- Paracelsus as Physician. C. G. Jung.—p. 1153.
- *Particular Indication for Apical Thoracoplasty. G. Rossel.—p. 1158.
- Increasing Efficacy of Welfare Work for Tuberculosis Patients. R. Kipfer.—p. 1161.

Apical Thoracoplasty.—Rossel stresses that an artificial pneumothorax is of only limited duration. Efforts should be made to avoid complications likely to endanger the flexibility of the pleura and of the pulmonary tissue. The most frequent and most dreaded complication in this respect is pleurisy. Pleuroscopy has disclosed that early and efficient freeing of adhesions is helpful in reducing dangerous pleurisy. Nevertheless, exudates are encountered almost constantly in the particular type of pneumothorax to which the author calls attention. He designates this type as "arched" pneumothorax. He has reference to the pneumothorax induced for apical lesions, usually for cavities. The detachment is easily accomplished except in the extreme apex which remains more or less adherent to the pleural dome and the mediastinal border. This adhesion, although limited, is particularly undesirable since it is here that the principal lesion is located. This type of pneumothorax is not effective in converting the sputum. The diseased tissue is imprisoned in a dead angle, and its liberation with the cautery is excluded by reason of the symphyseal nature of the adhesion. To prevent this unfavorable condition the author recommends apical thoracoplasty, either alone or in combination with the existing pneu-

mothorax. These interventions are not readily accepted by the patient and his family. The physician should have sufficient authority to convince them of the necessity of the intervention. The operation is not shocking, because a considerable pulmonary collapse is present. Resection of five or six ribs at one time represents nothing more than a plastic operation, a simple modification of the thoracic wall; the amount of visceral manipulation, which is the cause of shock in ordinary thoracoplasty, is nil or almost nil. In the 4 cases patients in which the author performed apical thoracoplasty for this particular indication the postoperative course was extraordinarily benign.

Arquivos Brasileiros de Oftalmologia, São Paulo**4:231-314 (Oct.) 1941. Partial Index**

- *Tumors of Optic Nerve. J. Pereira Gomes.—p. 231.

Tumors of Optic Nerve.—Pereira Gomes states that primary tumors of the optic nerve are rare. In the Brazilian literature, 13 cases have been reported. Primary intradural tumors of the optic nerve are benign, except for slight local malignity. The author reports that a patient operated on twenty-one years ago is in good health at present. Importance of the relationship of the tumors of the optic nerve and Recklinghausen's disease is stressed. Orbital intervention is of value in the treatment of many patients with glioma, but initial transfrontal craniotomy is inadvisable. The author prefers extirpation of the optic nerve for intradural tumors. Enucleation of the eyeball should be performed in exceptional cases when it becomes essential for the subsequent excision of the optic nerve. Golovine's technic of the opening of the capsule of the tumor for the removal of the growth is not advocated. Exenteration of the orbit should be performed in cases of extensive extradural tumors which fill the entire orbital cavity. In cases in which the tumor has already invaded the cranial cavity it is advisable to perform transfrontal craniotomy followed by orbital intervention. The performance of craniotomy should be reserved for the neurosurgeon.

Boletín de los Hospitales, Caracas, Venezuela**38:239-278 (April and May) 1939. Partial Index**

- *Local Sulfanilamide Therapy in Soft Chancroid. P. Guerra and A. Fuentes S.—p. 269.

Local Sulfanilamide in Soft Chancroid.—Guerra and Fuentes treated 25 patients with chancroid and phagedenic chancroid with sulfanilamide powder. The treatment consisted of washing the ulceration with warm water and covering it with fine sulfanilamide powder, obtained by pulverizing sulfanilamide tablets, and dressing it with plain gauze. The treatment was applied daily, and healing took place in four days to two weeks. The authors conclude that local application of sulfanilamide powder is the best treatment for simple and phagedenic chancroid, with or without suppuration. It is harmless, painless, nonallergenic and economical and brings about prompt results. The pain of chancroid is relieved in the first twenty-four hours of treatment.

Día Médico, Buenos Aires**13:1229-1256 (Nov. 24) 1941. Partial Index**

- New Treatment of Chronic and Acute Dacryocystitis. A. Sellarés and J. A. Mendía.—p. 1238.
- *Importance and Benefits of Blood Transfusion. E. S. Sanmartino.—p. 1239.
- *Vesical Paralysis of Central Origin: Testosterone Propionate Therapy. A. Casiello.—p. 1252.

Blood Transfusion.—Sanmartino advocates that interns be trained in blood transfusion and in the basic and technical details of the procedure. He further advocates the organization of well equipped centers for blood transfusion in all hospitals. These centers will function day and night with house physicians working in shifts. Training of interns to insure constant functioning of blood transfusion centers is of value in peace time as well as in war time.

Vesical Paralysis of Central Origin.—Casiello treated vesical paralysis of central origin with testosterone propionate. The treatment was effective in patients of either sex. Normal micturition took place after one or two injections. Three to four injections of 10 to 25 mg. each accomplished the results. Vesical paralysis was permanently controlled in 7 patients treated by the author.

Revista de Ortop. y. Traumatol., Buenos Aires**10:237-376 (Jan.) 1941. Partial Index**

*Multiple Epiphyseal Dystrophy: Clinical Study of Seven Cases. C. E. Ottolenghi and D. Muscolo.—p. 267.

Multiple Epiphyseal Dystrophy.—Ottolenghi and Muscolo report 7 cases of multiple epiphyseal dystrophy. There were two sets of brothers in the group. The disease is a clinical entity with clinical and roentgenologic characteristics which differentiate it from achondroplasia and other types of bone dystrophy. Heredity and familial factors are not indispensable for the development of the disease, which, as a rule, appears in children between the ages of 2 and 10 years and, in rare cases, in early youth. Symptoms consist of pain and rigidity of joints, progressive, slow, flexure of the hip joints and the knees, kyphosis and progressive deformation of the legs, sternum and thorax. Flatfoot, talipes valgus and permanent luxation of the patella are frequent. Roentgenograms reveal that the disease is bilateral and of multiple localization. The epiphyses are predominantly involved. The metaphyses and diaphyses are involved only in cases of grave epiphyseal dystrophy in which all the joints are involved. In such cases the diaphyses may be decalcified and the metaphyses flattened. The most acute lesions are those of the spine, hip joints and knees. The cranial bones, as a rule, are normal. The roentgenograms of patients in familial cases are similar. After adolescence the osteo-articular lesions no longer progress, but the deformities remain permanent. The deformity of the legs may interfere with locomotion, the articular changes may develop into arthritis deformans and the vertebral deformity may compress certain internal organs. Intelligence is greatly diminished, and some of the patients approach the status of idiocy. Endocrine disorders, especially those of the hypophysis, appear to be the cause of the disease. However, up to now opotherapy has not been effective. The treatment is orthopedic. It consists of continued extension, tenotomy, osteotomy and arthroplasty. The authors obtained satisfactory functional results from multiple orthopedic procedures.

Deutsche Zeitschrift für Chirurgie, Berlin**254:555-650 (June 6) 1941**

Inflammatory Diseases of Meninges of Spinal Cord with Particular Consideration of Space Limiting Adhesion. Rosemarie Feiler.—p. 555.

Clinical Aspects of Cystic Kidney. G. Rintelen and G. U. Tilk.—p. 588.

Periarthritis Humeroscapularis. M. Saegesser.—p. 616.

Testes and Spermatic Ducts After Vasectomy. F. Roulet and F. Andina.—p. 620.

*New Idea in Plastic Repair of Head of Tibia. H. Kast.—p. 628.

Yellow and Brown Discoloration of Intervertebral Disk. E. Güntz.—p. 633.

Plastic Repair of Head of Tibia.—Kast of Zurich effects plastic repair of the head of the tibia by a pedicled transplant from the anterior, distal part of the shaft of the femur. He inserts the head of the fibula through a slit into the head plate in order to avoid the lateral slipping off of the femoral condyles and at the same time provide support for the femur between the condyles.

Deutsches Archiv für klinische Medizin, Berlin**187:465-608 (July) 1941. Partial Index**

*Hepatorenal Syndrome in Patients with Congested Liver and Heart Disease: Its Modification by Salyrgan. W. Nonnenbruch.—p. 465.

Clinical Aspects of Carcinoma of Tail of Pancreas. A. Gebauer and W. Brosig.—p. 478.

*"Laster's Disease" (Spasms in Finger Capillaries in Workers on Lasting Machines). A. Schrank.—p. 491.

Ambar's Formula and Urea Purification Value in Self Experiment with Changing Tolerance. K.-F. Schmidt.—p. 519.

*Night Blindness as Symptom of Internal Disease, Particularly of Hepatic Disorders. R. Hasche-Klünder.—p. 524.

Amyloid Nephrosis, Amyloid Contracted Kidney and Blood Pressure. H. Willer.—p. 539.

Significance of Reticulum for Normal and Pathologic Erythropoiesis. W. Tischendorf.—p. 556.

Hepatorenal Syndrome and Salyrgan.—Nonnenbruch points out that in patients with heart disease and passive congestion of the liver the renal function frequently shows impairment which constitutes the hepatorenal syndrome. The term is applied to various changes in the renal activity which develop without anatomic changes in the kidney but which are dependent

on hepatic disease and which subside with its disappearance. Patients with passive congestion of the liver showed oliguria with hyposthenuria but without renal insufficiency ("hyposthenuria-N"), as well as oliguria with hyposthenuria and with renal insufficiency. In some cases complete anuria developed without essential anatomic changes in the kidneys. The hepatorenal syndrome with or without anuria developed in several patients immediately after the administration of salyrgan. This was not only true of patients with a congested liver but of a patient with hepatic cirrhosis, in whom fatal anuria followed the administration of salyrgan. This represents a hitherto unrecognized salyrgan impairment which probably has no connection with mercury and causes no anatomic changes in the kidney. Its mechanism is as obscure as is the hepatorenal syndrome itself. These observations of harmful effects of salyrgan should not lead to unjustified concern about this best of all diuretics. The physician must be on the lookout for the hepatorenal syndrome in every case of hepatic disease, particularly in the presence of passive congestion of the liver, and should know that it can be caused by salyrgan and related substances.

Laster's Disease.—According to Schrank, laster's disease is an occupational disorder which develops in workers on lasting machines. It is characterized by spasms in the capillaries of the fingers and develops in constitutionally predisposed workers as the result of irritation by vibration and cold. Capillaroscopy discloses severe spasms of the capillaries. The reaction is local and not of a central nervous nature, although the entire nervous system may become irritated if it persists for a long time. Therapy is ineffective as long as the man continues to work on the machine. Improvement results, if he changes his work, but symptoms may persist for some time. Treatment with diathermy and with alternating baths offers good results in cases of severe disease in which muscular and articular apparatuses are involved. Since alcohol and nicotine are vascular poisons, patients with laster's disease must abstain from them. Young workers are more predisposed to laster's disease than older workers. The author advises that men working on lasting machines be relieved after short periods and they should not work on these machines all the time. Compensatory gymnastics are advisable. Inquiries to shoe factories disclosed that the frequency of laster's disease had decreased from 50 per cent in 1931 to 11 per cent. In factories with modern, nonvibrating lasting machines and automatic holding devices laster's disease has completely disappeared.

Night Blindness as Symptom of Hepatic Disorders.—Hasche-Klünder directs attention to the fact that night blindness develops not only as the result of insufficient vitamin A consumption but in disorders in which the vitamin requirements are increased or in the presence of deficient absorption or of defective vitamin transformation. According to Zaffke and many other investigators dark adaptation is impaired in many internal diseases, particularly in hepatic disorders. At the author's hospital dark adaptation was tested in 20 patients with hepatic cirrhosis. Defects, some severe, were detected in 19. Of 9 patients with catarrhal icterus 5 had impaired dark adaptation. The author suggests that in patients with icterus the appearance of night blindness and its severity might permit prognostic conclusions with regard to morphologic changes in the liver. Disturbances of dark adaptation were observed in cases of severe cholecystitis, cholelithiasis and cholangitis associated with jaundice. The author suggests that the dark adaptation test may be utilized as a functional test of the liver. Night blindness is demonstrable also in all secondary avitaminoses resulting from sprue, carcinoma, achylia and the like.

Zentralblatt für Gynäkologie, Leipzig**65:1405-1436 (Aug. 2) 1941. Partial Index**

*Rapid Determination of Vitamin C with Rotter's Intradermal Test. W. Dollé.—p. 1414.

Rare Case of Complicated Perforation of the Uterus and Its Cure. H. Husslein.—p. 1423.

Interesting Birth of Uniovular Twins. W. Lang.—p. 1427.

Rapid Determination of Vitamin C.—Dollé used the intradermal test of Rotter for the determination of vitamin C in 82 patients. The test is based on the fact that the injection of a small quantity of dichlorophenolindophenol is followed by

decoloration much more rapidly if the vitamin C supply is normal than if scurvy is present. Rotter concluded that the decoloration time indicates the vitamin C saturation of the tissues. He observed that in persons saturated with vitamin C the dye disappears from the skin in less than five minutes, in persons who receive a normal diet in five to ten minutes and in persons with an inadequate supply after more than ten minutes. Of the 82 patients tested by Dollé 55 had a prolonged decoloration time, suggesting vitamin C deficiency. Dollé concludes that Rotter's intradermal test is adequate for a rough quantitative estimation of fluctuations in the vitamin C content. The test is simple and requires little time. Results obtained in the 82 cases indicated that a C hypovitaminosis may exist even in the absence of signs.

Folia Pharmacologica Japonica, Kyoto

33:1-110 (Sept.) 1941. Partial Index

*Test Method for Digitalis with French Mice (*Mus Musculus* Var. Alba). E. Yamasaki.—p. 75.

Digitalis Test Method with French Mice.—Yamasaki used French mice (*Mus musculus* var. alba-Beckstein) as test animals in determining the potency of digitalis and strophanthin preparations. The sensitivity of these animals to g-strophanthin appears to be identical irrespective of sex, pregnancy or season; but definite differences are noticeable as to age (body weight) and diet. The standardized test condition should include a standardized diet and the minimum body weight of 20 Gm. In such animals the minimal lethal dose of g-strophanthin by subcutaneous injection should be 0.008 to 0.009 mg. per gram of body weight. Sensitivity to digitalis in standardized mice approximates that of rabbits, is lower than that of dogs, cats, guinea pigs and Chinese mice but is higher than that of white rats. As tested in French mice, the digitalis leaves are more potent than the injectable digitalis preparations; digitoxin is more effective than g-strophanthin, all in agreement with the common clinical experience. There is a significant variation in the minimal lethal dose of four varieties of digitalis preparations when tested by the intravenous, the intraperitoneal or the subcutaneous route. This is explained by the fact that in subcutaneous or intraperitoneal administration the effect is due to the slow-acting digitoxin component, whereas in intravenous injection the quickly acting gitalin, gitoxin and genine are chiefly responsible for the digitalis action. By a combination method, in which all these routes of administration are employed, the potency of the preparation as a whole can be tested and the comparative effects of all ingredients can be determined. The strength of the digitalis preparations to be employed in the test method with French mice should be a 10 per cent infusion of the leaves, 0.02 per cent of digitoxin and 0.02 per cent of g-strophanthin, while for injections the entire contents of ampules are used.

Kitasato Archives of Experimental Medicine, Tokyo

18:97-170 (Aug.) 1941

Studies Concerning Japanese Epidemic Encephalitis Virus in Eye. R. Arizawa.—p. 97.

*Serologic and Bacteriologic Observations in Paratyphoid B Cases: (I) Analytic Widal Reaction of Patients' Serums. H. Anzai.—p. 114.

*Id.: (II) Complement Fixation Test, Serum Protection Test and Observations on Strains of Paratyphosus B Isolated from Patients' Blood or Feces. H. Anzai.—p. 124.

Action of Sulfamethylthiazole (Toriseptin M) in Mice Infected with Pneumococcus. F. Ozeki.—p. 135.

Intoxication by Manganese in Well Water. R. Kawamura, H. Ikuta, S. Fukuzumi, R. Yamada, S. Tsubaki, T. Kodama and S. Kurata.—p. 145.

Paratyphoid B.—Anzai points out that since the observation of "specific phase and nonspecific phase variation" of *Bacillus paratyphosus* B and other *Salmonella* types it has been believed that the flagellar variation of a bacillus had no connection with its virulence or pathogenicity. Investigations on "Vi antigen" of *Bacillus typhosus* clarified the relationship between the antigenic structure of *B. typhosus* and its virulence: the V form of this organism, which possesses Vi antigen, has a stronger virulence for mice as well as pathogenicity for human beings than the W form bacillus without Vi antigen, and almost all bacilli isolated from blood of patients with typhoid belong to V or VW form. The author attempts to clarify which phase (specific or nonspecific) bacillus may be isolated from blood or feces and

which phase H agglutinin may be found in the serum of patients with paratyphoid B. He tried the analytic Widal reaction with 85 specimens of serum collected from 42 patients with *B. paratyphoid* B infection and in the serums of 60 (71 per cent) the specific H agglutinin for *B. paratyphosus* B was detected; in the serum of 46 (54 per cent) the specific H agglutinin only was demonstrable; in the serum of 14 (17 per cent) both specific and nonspecific H agglutinins were demonstrable; 25 specimens (29 per cent) of serum showed the nonspecific H agglutinin only. The H agglutinin (specific or nonspecific) for *B. paratyphosus* B was elaborated to the maximum titer within the second or third ten days from the onset of disease. The O agglutinin was produced somewhat more slowly than the H agglutinin. A rise of the agglutinin titer for *B. typhosus* and *B. paratyphosus* A was demonstrated in the case of *B. paratyphosus* B. The production of such heterophilic agglutinins goes parallel with that of the causative organism. The author found in absorption tests that the agglutinins for *B. paratyphosus* B and *B. typhosus* existed in the serum of patients as well as in normal serum. Agglutinins for Y 27 strain (agglutinated specifically in the presence of Vi antibody) and *B. paratyphosus* C showed almost all the same titer in the whole course of illness. Family infection is not always caused by the same phase bacillus.

Paratyphoid B Cases: Complement Fixation and Other Tests.—Anzai describes results of the complement fixation test and of the serum protection test with the serum of patients with paratyphoid B. The specimens were the same ones used in the aforementioned experiments, and the antigens used were prepared with the autogenous bacilli which had been isolated from blood or feces. The author found that bacilli isolated from blood or bile in cases of paratyphoid B fever show greater phase stability than those from feces when subcultured on plain agar or endoagar or in normal broth or Kauffmann's tetrathionate broth medium. Freshly isolated organisms showed remarkable decrease in their virulence during the preservation for half a year by being subcultivated monthly on plain agar. Flagellar antigens are not concerned with the virulence of a bacillus. It may be inferred that H antigens take part in complement fixation activity. Serum protection tests were conducted with patients' serum, and it was demonstrated that both specific and nonspecific flagellar antibodies have no relation to the protecting activity.

Okayama-Igakkai-Zasshi, Okayama

53:1527-1762 (Aug.) 1941. Partial Index

*Remote Postoperative Results in 33 Cases of Splenectomy. S. Wada.—p. 1711.

Remote Postoperative Results of Splenectomy.—Wada made a statistical study of 33 patients with a variety of diseases, on all of whom splenectomy was performed. Eight (24.2 per cent) died soon after the operation. Of 17 cases of Banti's disease in which the spleen was removed during the first stage of the disease death did not occur in any immediately after the operation. Splenectomy performed during the second stage of Banti's disease resulted in a mortality of 16.6 per cent, while cases in which treatment had been delayed (third stage) were attended by a high mortality rate (40 per cent). Although fatal termination was unavoidable, splenectomy appeared at least to bring about temporary comfort to the patients and to prolong the survival period, even when performed at late stages of the disease. In one instance of syphilitic splenomegaly surgical removal of the organ was followed by a period of thirteen years and eight months in which the patient remained in relatively good health. In some of the cases of Banti's disease in which splenectomy was performed during the third stage the survival period was prolonged to more than three years after the operation.

Taiwan Igakkai Zasshi, Taihoku, Formosa

40:1349-1556 (Aug.) 1941. Partial Index

*Bronchial Asthma with Bronchomycosis *Aspergillina*: Case. G. Yogo.—p. 1540.

Bronchial Asthma with Bronchomycosis *Aspergillina*.—Yogo reports a case of bronchial asthma with bronchomycosis *aspergillina* in a female patient aged 43 who presented a typical clinical picture of allergic bronchitis with secondary anemia and leukocytosis with a shift to the left, but without eosinophilia,

together with an increased sedimentation rate and the expectoration of greenish yellow sputum. The mycelial forms were obtained first from the sputum, and on one occasion a few leukocytes were seen with phagocytosed spores of the fungus on Gram stained smears. When the patient was skin tested with extracts of aspergillus and of alternaria in Coca-Milford's fluid, the former gave a positive reaction, while the reaction to the latter was entirely negative. The clinical manifestations of the disease showed definite improvement after ten days of intensive treatment with 1 Gm. each of potassium iodide and potassium bromide by mouth.

Geneeskundig Tijdschr. v. Nederl.-Indië, Batavia

81:2177-2232 (Oct. 14) 1941

Places Where Infected Anopheles Maculatus Was Found During an Epidemic of Malaria in East Java. W. G. Venhuis.—p. 2178.

Pronounced Frontal Inclination of Sinus Transversus and Consideration of Position of Mastoid Portion of Sinus Transversus in Indonesian Patients Undergoing Operation. Moewardi.—p. 2189.

Syphilis in the Third District of Island of Curaçao, Netherland West Indies. H. Spitzer.—p. 2199.

Meningocele. R. Hendarmin.—p. 2206.

Sulfapyridine in Treatment of Meningococcic Meningitis: Case. L. van der Molen.—p. 2208.

*Another Case of Thrombopenic Purpura Caused by Quinine. W. J. Bais.—p. 2213.

Thrombopenic Purpura Caused by Quinine.—Bais points out that purpura caused by quinine, while rare, is likely to be encountered in the Netherland Indies because of the extensive use of quinine medication. He describes a case of quinine purpura observed by him, this being the third case of this type recently reported. Recognition of such cases is made difficult by the fact that malaria itself may cause capillary toxicosis. He suggests that synthetic drugs be employed whenever hemorrhages occur in the course of treatment of malaria.

81:2233-2280 (Oct. 21) 1941

Hyperchromic Pregnancy Anemia. P. J. Zuidema.—p. 2234.

*Paroxysmal Paralysis (Familial, Periodic Paralysis): Case. P. J. van der Schaar.—p. 2241.

*Combat of Hookworm in Simpson Bay (St. Martin) in Netherland West Indies. H. Spitzer.—p. 2255.

Gluteal Erythema (Jacquet). D. P. R. Keizer.—p. 2259.

New Method of Roentgenographic Projection of Zygomatic Arch. G. J. Staverman.—p. 2264.

Dermoid Cyst in Mediastinum. D. Brouwer.—p. 2267.

Case of Sarcoma Probably Originating in Liver: Formation of Metastases. W. G. F. Buning and J. R. von Ronnen.—p. 2269.

Paroxysmal Paralysis (Familial, Periodic Paralysis).—A laborer aged 34, of the emotional type, showed, after a day of exhausting field maneuvers, paralysis of all four extremities and to a considerable extent of the respiratory muscles. The paralysis persisted for several hours and then regressed, so that after twenty-four hours the man had regained the full use of his extremities. The tendon reflexes were abolished at the height of the paralysis. The disorder was diagnosed as paroxysmal paralysis. In the literature the disorder has been designated as familial periodic or paroxysmal paralysis. In Europe the familial and hereditary form seems to predominate, but in Japan hereditary and familial factors seem to be of minor importance. The attack usually begins at night; in the reported case the paralysis began during the midday rest. Prodromal symptoms may exist and can be traced to disturbances in the sympathetic nervous system: there may be weakness, headache, nausea, dryness of the mouth, thirst, morbid hunger and the feeling that the intestine does not function properly. Some authors think that intestinal disturbance in the form of autointoxication is the cause of the paralysis. The disorder is more frequent in males than in females (4:1, according to Straus). The attacks often begin with puberty and subside after the thirty-fifth year. The first attack may occur during the pre-senium. The interval between the paroxysms may be weeks, months or even years. Many symptoms point to the central vegetative centers, and the hypothalamus has been regarded as important. Potassium compounds have been used effectively in the treatment of the attacks. Van der Schaar cites reports on the hereditary transmission of paroxysmal paralysis and on the concurrence of paroxysmal paralysis and progressive muscular dystrophy.

Hookworm in Netherland West Indies.—Spitzer relates the story of hookworm infection, brought in 1890 to Simpson Bay, a settlement of white fishermen on St. Martin in the Netherland West Indies. The disease gradually spread, and some children died of it. The food shortage during the years from 1914 to 1918 greatly intensified the infection. The people did not know the cause of the disease. Physicians of the health service discovered hookworm infection in 1917 and began treatment with oil of chenopodium. In 1930 it was found that the majority of the inhabitants of Simpson Bay were again infected with hookworm. Chenopodium treatment was resumed, and regulations were passed regarding disposal of excreta, wearing of shoes and submission to examination and, if necessary, to treatment. Control examinations in recent years disclosed that the hookworm had been eradicated. The author concludes that (1) in the crusade against hookworm, individual therapy, where possible, is preferable to general treatment; (2) in areas where hookworm infection is endemic definite results cannot be obtained without hygienic measures; (3) none of the known medicaments alone are entirely satisfactory, and (4) various medicines should be considered, especially chenopodium oil and tetrachlorethylene.

Acta Obst. et Gynec. Scandinavica, Stockholm

21:199-314 (No. 3) 1941. Partial Index

*Hypoprothrombinemia Neonatorum and Its Relations to Vitamin K. M. Rouhunkoski and N. Saksela.—p. 203.

*Perineal Endometriosis After Prolapse Operation. A. Jessing.—p. 225.

Hypoprothrombinemia Neonatorum and Its Relations to Vitamin K.—Rouhunkoski and Saksela report the results of examination of the prothrombin content of the blood of newly born infants with the micromethod of Plum and Dam. The authors made their studies on 74 full term infants of normal mothers, on 15 premature infants of normal mothers, and on 14 infants whose mothers had a nephrogestosis. They compared also the prothrombin time of the blood in the mother, the child and the umbilical cord. During the first hours after delivery infants born at term had an average prothrombin time of fifty seconds (normal time twenty-five to thirty-five seconds), but after that it increased decidedly, reaching ninety-five and eight-tenths seconds on the second day. The prothrombin time was still long on the third and fourth days and then gradually diminished. On the ninth day it was near the normal level. In the prematurely born the mean prothrombin period was somewhat shorter than in full term infants. The prothrombin period of the infants born to mothers with nephrogestosis generally was longer than was that of the infants of healthy mothers. It is assumed that variations in the permeability of the placenta to prothrombin and possibly to vitamin K play a part in the differences in prothrombin time. Comparison of the prothrombin time of the blood in mothers, infants and umbilical cords disclosed that it averaged twenty-four and three-tenths seconds in the mothers, forty-four seconds in the umbilical cord and forty-nine and one-tenth seconds in the infants. The greater the difference between the prothrombin time of the maternal and the umbilical cord blood, the greater was the maximum prothrombin period in the newborn infant. The physiologic decrease in the prothrombin time of the newborn could be almost completely prevented by the injection of vitamin K into the mothers from fifty hours to one hour before birth or into the infants immediately after birth.

Perineal Endometriosis After Prolapse Operation.—Jessing reports the case of a woman aged 39 with symptoms of prolapse and irregular menstruation. The operative intervention consisted of curettage and anterior colporrhaphy and colpo-perineoplasty. Three months after operation ventrosuspension of the uterus was performed. About six months after the colporrhaphy she began to suffer from "boils" in the perineum during each menstruation. A few days before the onset of the menses there would appear a small, tender nodule that increased in size during menstruation, perforated and discharged blood and mucus. It disappeared with the cessation of the menses. The nodule increased in size from that of a pigeon's egg to that of an orange. The microscopic examination of the tumor when it was removed established the diagnosis of endometriosis. The endometriosis apparently developed as the result of implantation in the course of the operation.

Book Notices

The Blood Bank and the Technique and Therapeutics of Transfusions. By Robert A. Kilduffe, A.B., A.M., M.D., Director, Laboratories, Atlantic City Hospital, Atlantic City, N. J., and Michael DeBakey, B.S., M.D., M.S., Assistant Professor of Surgery, School of Medicine, Tulane University of Louisiana, New Orleans. Cloth. Price, \$7.50. Pp. 538, with 215 illustrations. St. Louis: C. V. Mosby Company, 1942.

Few books may be considered more timely than this volume, as the problems relating to blood banks and transfusions are increasing in importance and in detail. The sixteen chapters represent a sincere attempt to present the necessary information with a minimum of wasted words. Following an interesting and well illustrated chapter on the history of the development of blood transfusion there appear adequate discussions on the rationale, indications and contraindications, the military aspects of transfusion, special types of transfusion, technic of blood typing and compatibility tests, anomalous blood typing reactions (their nature, causes and detection and methods for their elimination), the "universal donor" and the "universal recipient," blood bank, the changes which occur in stored blood, the biochemical changes in stored blood, the operation of a blood bank, plasma transfusion, the preparation and preservation of concentrated and dried plasma, methods and technic of transfusion and complications of blood transfusion. There are several commendable features to this book in addition to the logical arrangement of the descriptions and the comparative simplicity of the authors' terminology; these include an adequate index, profuse and meticulous illustrations and complete lists of references. As an example of the latter, the chapter on rationale, indications and contraindications contains over nine hundred references, and the chapter on complications of blood transfusion lists almost six hundred references.

A Textbook on the Nursing and Diseases of Sick Children for Nurses. By Various Authors. Edited by Alan Monerleff, M.D., F.R.C.P., Physician to the Children's Department, Middlesex Hospital, London. Third edition. Cloth. Price, 21s. Pp. 639, with 142 illustrations. London: H. K. Lewis & Co., Ltd., 1941.

This edition is completely revised and slightly longer than the first and second editions. A new chapter on children in the tropics and a new section in the appendix on physical therapy have been added. Not only has the text of the other chapters undergone extensive revision but the number of illustrations has been increased and many are changed from those used in former editions. The text maintains its well organized but informal style and is rich in factual data necessary for pediatric nursing in the hospital or the home. Instructions are concise and explicit, and the material is particularly adapted for sound nursing education. Few pediatric textbooks for nurses devote as much space to desirable orthopedic information as this edition. The chapters on infant feeding and disorders of nutrition would not be considered adequate for instruction of nurses in this country and is not in keeping with the quality of the other chapters in the book. In general, this textbook can be well recommended for hospital libraries and as a reference book for nurses to supplement standard works on pediatric nursing now in common use.

Objective and Experimental Psychiatry. By D. Ewen Cameron, M.D., Professor of Neurology and Psychiatry, Albany Medical College, Albany. Second edition. Cloth. Price, \$3.75. Pp. 330. New York: Macmillan Company, 1941.

The present volume is a second edition of a monograph which has an unusual aspect. Its contents differ from the psychiatry presented in textbooks which is of a descriptive and clinical nature in that it attempts to bring together research material from allied fields rather than conventional hospital and clinical psychiatry. The studies made by the psychologist in evaluating the use of intelligence testing, particularly those phases having to do with psychopathology, studies made by nutritionists, endocrinologists and others in the psychosomatic field, and the research carried on by many individuals in several spheres of scientific endeavor having to do with the electrical aspects of mental function and the use of electrical tests with relation to psychology are also emphasized. The present edition is far superior to the original edition, which was rather sketchy and lacked the emphasis on citations with the fulness which the

present volume contains. The material on psychosomatic medicine, endocrine aspects of psychiatry and electrical phenomena which could not be emphasized to the same extent in the original edition, which came out about five years ago, all find a place in the present volume. It is an excellent contribution to the psychiatric field and is a service rendering supplement to conventional psychiatry. It opens vistas which have been revealed to the hospital and clinical psychiatrist previously only in glimpses.

Diseases of the Nervous System Described for Practitioners and Students. By F. M. R. Walshe, O.B.E., M.D., D.Sc., Physician in charge of the Neurological Department, University College Hospital, London. Second edition. Cloth. Price, \$4.50. Pp. 325, with 32 illustrations. Baltimore: William Wood & Company, 1941.

The first edition of this abbreviated textbook of neurology was reviewed in *THE JOURNAL* on June 21, 1941, page 2823. The question raised at that time as to its usefulness has been amply answered in the affirmative by the demand which has made necessary a second edition within a year's time. The book has been extensively revised, and several excellent illustrations have been added. The most extensive revision is of the section on intracranial tumor, which has been materially improved; yet it is difficult to understand the author's attitude of extreme pessimism regarding intracranial gliomas, which is not in keeping with American experience. Can this possibly be due to lack of diagnostic acumen or lack of interest, or maybe to contact with incompetent neurosurgeons? The statement "All gliomas ultimately prove fatal" simply is not true when interested clinicians and able surgeons are in charge. Certainly the picture presented by these tumors as a group is a distressing one, and physicians have passed beyond the stage at which blinding themselves and others to this fact is excusable, but the opposite attitude is equally reprehensible. The series of cases of astrocytoma of the cerebellum in which as high as 90 per cent of the patients have been completely relieved of all symptoms of their tumors for so many years that at least some of them can be regarded as "cured" and the cases of less common cerebral tumors in which similar results have been obtained by removal of an isolated nodule within a cyst or amputation of a frontal or an occipital lobe containing all of the tumor are not to be ignored. Furthermore, the author gives no indication that for many of the slowly growing gliomas appropriate operation will provide material relief from symptoms and several years of happy, useful life.

The section on the sensory system has been considerably enlarged and improved, as has the section on meningococcal meningitis. An elementary section on tissue reactions of the nervous system has been added.

Many of the errors pointed out in the previous review have been corrected; many persist. The statement that visual impulses from the retina to the area striata of the calcarine cortex pass through the pulvinar persists. There is no evidence that the pars intermedia and the pars posterior of the hypophysis are closely associated physiologically. It is interesting that the author would ascribe to the combined action of the secretion of the pars posterior and "certain nuclei in the walls of the third ventricle" such questionable functions as the stimulation of smooth muscle and the regulation of blood pressure and of sugar metabolism and ignore the one established function—the control of water metabolism. Although vasovagal syncope is discussed, no mention of hyperirritability of the carotid sinus or of spontaneous hypoglycemic attacks is found. In the discussion on multiple sclerosis, one is amazed to find the statement that the lesions do not destroy the axis cylinders. Although this is often true of early or mild lesions, it is not true of many of them. In the discussion of the disturbances produced by a cervical rib there is but fleeting mention of the scalenus anticus syndrome and no reference to the valuable procedure of section of the scalenus anticus muscle in both conditions. It is impossible to imagine how a neurologist of the author's experience could say that syringomyelia is almost invariably painless. The statements that trigeminal neuralgia rarely makes its appearance before the age of 50 and that the pain never first appears in the first division are not in accord with the facts.

The discussion of the treatment of epilepsy, on pages 109 to 113, will be worth more than the cost of the book to all physicians who will follow its excellent suggestions. They may,

however, find the injection of 3 grains (0.2 Gm.) of soluble phenobarbital more than a little inadequate in controlling status epilepticus.

The book remains a disappointingly elementary presentation of an interesting subject by an experienced and able author. One hopes that when the author is freed from his military responsibilities he may undertake a more adequate treatment of the subject.

Alergia nasal: Coriza o rinitis espasmódica: Sintomatología, diagnóstico, reacciones alérgicas concomitantes, tratamiento. Anafilaxia y alergia: Conceptos modernos. Por el Dr. Emilio E. Bacigaluppi. Tesis de doctorado. Universidad nacional de Buenos Aires, Facultad de ciencias médicas, Escuela de medicina. N.º 3291. Paper. Pp. 226, with illustrations. Buenos Aires: La Semana Médica, Imp. de E. Spinnelli, 1940.

The work begins with an introduction, or prologue, which deals with the history of anaphylaxis and leads up to the first chapter. In this the author takes up the definition of anaphylaxis and allergy and discusses at length the difference between the two. Here, as in the rest of the work, he quotes freely from American and European authors. The whole work is more or less a compendium of present day knowledge. The work as a thesis reveals a great deal of painstaking effort in reviewing the literature on the subject, beginning with the observations of Magendie in 1839 and following it up to the present day. The only original work done by the author is contained in the 450 case histories at the end of the book. Here he confirms points already proved by others. Although the work does not make any claim to originality, it is nevertheless filled with valuable information. It will be helpful to any one desiring a fundamental knowledge of allergy, particularly in reference to the upper respiratory tract. It is written in concise, clear style and makes rather interesting reading. The chapter on treatment is complete. Therapeutic measures outlined are all accepted methods and of proved value.

Principles and Practice of Orthodigita. By Harry A. Budin, M.Cp., Head of the Department of Orthodigita, The First Institute of Podiatry, Long Island University, New York. Edited by Herman Schelmsberg, M.Cp. Cloth. Price, \$4. Pp. 263, with 144 illustrations. New York: Strathmore Press, 1941.

Before the review can be understood the word "orthodigita" must be defined. Orthodigita is a branch of podiatry practice concerned with the prevention, amelioration and correction by nonsurgical means of toe deformities and malalignments, as well as the resultant lesions and other painful effects. One of the objectives of orthodigital treatment is alleviation of pain incidental to deformity (corns, calluses or inflamed bursae) as well as that concurrent with traumatic arthritis, hallux rigidus, Morton's toe, or improper functioning of the toes of the fore foot. Practice is based on the principle that joint contractures can in most cases be stretched sufficiently to allow a toe to resume its normal alignment. This involves the employment of tractive forces. For the past ten years the author has been actively engaged in developing appliances and technics for the correction of toe deformities by nonsurgical means. Several of the appliances appear to be effective. However, "before and after" illustrations would aid in determining the value of apparatus or procedure.

Low Back and Sciatic Pain Caused by Intervertebral Disc Herniation: Anatomic and Clinical Investigations. By Sten Friberg. Translated from the Swedish by Catherine Djurklou. Acta chirurgica Scandinavica. Vol. LXXXV, Supplementum 64. Paper. Pp. 114, with 21 illustrations. Stockholm: P. A. Norstedt & Söner, 1941.

This small book can be recommended as among the best of all the contributions to this comparatively new and therefore controversial subject. The author has presented the clinical as well as the anatomic aspects of the subject. He had extensive material and clinical resources. His colleagues and collaborators were among the best that Scandinavia has to offer. Among his fellow workers were Waldenström, Backman, Sjöwall, Knutsson, Izikowitz and Carstam. The author's conception of the contributions by the American authors is truly remarkable. The translation from the Swedish is excellent.

Friberg states that the term sciatica was originated by Cotugno in 1764, exactly one hundred years before Lasègue described the sign known by the latter's name—sometimes called the Goldthwait sign. He points out that Cotugno stated that, despite the fact that sciatica is regarded as a neuralgia, the pain

never affects the whole nerve; that is, it never involves both the tibial and the peroneal branches but only the latter. He states that the first intervertebral disk herniation to be described clinically is the one described by Kocher in 1896.

Friberg discusses the relationship between the lumbar nerve roots of the spine as well as experimental investigations on lumbar disk herniation. He believes that during life it must be assumed that the nucleus is degenerated before it ruptures, unless the intervertebral disk has been submitted to unusual violence. Extremely strong pressure, sufficient to enter the bony substance, he believes is a prerequisite to protrusion of the annulus fibrosus. If the whole or a part of the nucleus pulposus is loosened, the detached portion alone protrudes. In his description of observations made before and after the operation, he makes the direct statement that the intervertebral disk in the intervertebral space exposed by operation was on the whole unchanged. That is, the space was not narrowed despite the fact that operation had revealed perforation of the annulus fibrosus through to the nucleus pulposus and that large portions of the latter had been removed. Not all disk prolapses produce symptoms of sciatica, nor are all sciatic troubles due to herniations. Herniations up to 8 by 8 by 8 mm. may lie lateral to the dura and nerve root without a demonstrable filling defect in the myelogram. The author describes his own method of removing iodized oil from the spinal canal without operation. He illustrates his low adjustable cradle frame on which the patient lies during the operation.

A Primer on the Prevention of Deformity in Childhood. By Richard Beverly Raney, B.A., M.D., Associate in Orthopaedic Surgery, Duke University School of Medicine, Durham, N. C. In collaboration with Alfred Rires Shands Jr., B.A., M.D., Medical Director, Alfred I. Du Pont Institute of the Nemours Foundation, Wilmington, Del. Cloth. Price, \$1. Pp. 188, with 88 illustrations by Jack Wilson. Elyria, Ohio: National Society for Crippled Children, Inc., 1941.

The reader of this review is cautioned to understand at the outset the types of persons for whom the book was written: general practitioners, public health nurses, physical therapists and welfare workers. The author directs his book toward the person who first comes in contact with those children whose illness may produce residual deformity. The author discusses the common diseases of childhood which may cause deformities and then discusses deformities of the upper extremity, lower extremity, neck, back and chest. He believes deformity can be prevented in either of two ways—first by forestalling the causal effects or by preventing the tissue changes which these disorders tend to produce. A glossary of routine orthopedic terms is added. The observance of simple preventive measures will often forestall serious deformities, while neglect of these measures, through ignorance or other causes, will not only allow the deformities to develop but may allow them to become so advanced that their subsequent correction becomes impossible. It is therefore important that those who first see the affected children should possess a knowledge of preventive treatment.

Alergia polínica. Por el Dr. José A. Bozzola. Tesis de doctorado en medicina. Universidad nacional de Buenos Aires, Facultad de ciencias médicas, Acta No. 5363. Paper. Pp. 235, with illustrations. Buenos Aires, 1940.

The book is divided into four parts. The first part is mainly devoted to the definition of terms and a discussion of the difference of opinions among authors. He suggests the term *alergia polínica* (pollen allergy) as best suited to describe the clinical manifestations produced by the inhalation of pollens. The remainder of this chapter is devoted to the history of pollinosis. The second part is devoted entirely to botany. This is a complete discussion and description of pollen grains and the mechanism of pollination. This chapter describes what he terms the allergenic flora of the Argentine, and this could be considered the most useful part of the book. It would certainly be of great interest to any one desiring a knowledge of the pollens predominating there. The third and fourth parts of the book represent a good compilation of the present state of knowledge concerning allergy. It undoubtedly will be of great assistance in the study of allergy in the Spanish speaking countries, where there is a lack of literature published in that language. The bibliography is extensive and complete. The last part of the book is given over to a series of case histories. The index is of assistance.

Queries and Minor Notes

THE ANSWERS HERE PUBLISHED HAVE BEEN PREPARED BY COMPETENT AUTHORITIES. THEY DO NOT, HOWEVER, REPRESENT THE OPINIONS OF ANY OFFICIAL BODIES UNLESS SPECIFICALLY STATED IN THE REPLY. ANONYMOUS COMMUNICATIONS AND QUERIES ON POSTAL CARDS WILL NOT BE NOTICED. EVERY LETTER MUST CONTAIN THE WRITER'S NAME AND ADDRESS, BUT THESE WILL BE OMITTED ON REQUEST.

CARCINOMA OF THE PROSTATE

To the Editor:—Will you please give me information about prostatectomy, particularly when it is performed for a malignant neoplasm? What about acid phosphatase, stilbestrol and castration? Can you give any other item of interest?
M.D., California.

ANSWER.—It is the opinion among urologists that once the clinical diagnosis of carcinoma of the prostate has been made it is technically impossible to do any sort of surgical procedure that would effect a cure. Once the diagnosis of carcinoma of the prostate has been definitely made, the condition is no longer surgical. Obstructions resulting from the lesion can be removed by transurethral resection, and attempts may be made to control the progress of the disease by roentgen or radium therapy but there is no case in which either one has been proved to cure a patient. These measures are instituted only for the purpose of some control of the progress, as well as for the control of associated local pain.

The question about acid phosphatase carries no particular meaning, as this substance is not used in any way for treatment. Acid phosphatase is found in fairly high concentration in the normal prostate and is recognized as a product of adult prostatic epithelium. Recent investigation has revealed that malignant hyperplasia of this epithelium increases the acid phosphatase content to such an extent that its increase becomes appreciable in the blood stream; hence active carcinoma of the prostate, especially when associated with metastases, will usually produce an increase in the acid phosphatase content of the blood serum.

Activity associated with carcinoma of the prostate is increased by an increase in androgens, or male hormones, of that particular body. Hence it was reasoned that to control this activity one must either eliminate the chief source of the male hormone of that body or use something which tends to neutralize its effect. In the first instance castration would eliminate the source of male hormone production in the male, not entirely but almost so. It is not surprising that this operation has had the effect that the original experimenters had anticipated and that as a result many fine clinical responses are being obtained by castration in cases of hopeless carcinoma of the prostate.

A less dramatic and obviously less complete method of doing the same thing would be irradiation of the testicles to reduce the elimination of androgenic substance.

For the purpose of neutralizing androgen without disturbing the source of its formation, application of estrogenic substance is used. Accordingly, administration of diethylstilbestrol (an estrogenic substance), when the drug used in the proper dosage, has a tendency to a lesser degree than the other two procedures to reduce activity of carcinoma of the prostate; it tends to decrease progress and, above all, has a clinical effect on the control of local pain. It is for this purpose that diethylstilbestrol is chiefly used by physicians who have had any important experience with any of the methods. Diethylstilbestrol should be given in 1 mg. doses, three times a day, and the dose should be gradually decreased after tolerance has been established to the smallest dose sufficient to keep up the necessary response. Patients have been kept for long periods on a regimen of 0.5 mg. twice a day after having started with 3 mg. a day and having the dose gradually decreased. Clinical evidence of tolerance to this drug is gynecomastia, the degree of which determines the dose. Medication should not be continued in full doses once this symptom has appeared but should be kept just under the level necessary to produce enlargement and tenderness of the breasts.

LICHEN PLANUS OF MOUTH

To the Editor:—Please let me know if there is any cure for lichen planus of the mouth. What is the treatment for this condition?

David Warsaw, M.D., New York.

ANSWER.—Lichen planus of the mouth, especially when the lesions are superficial, usually responds to the same type of general therapy as is used in lichen planus elsewhere. Treatment should consist of mental and physical rest and the use of arsenic, which may be given as solution of potassium arsenite (Fowler's solution) in increasing doses, or as the Asiatic pill

1/16 to 1/32 grain (0.004 to 0.002 Gm.) two or three times daily. The patient must be carefully watched for symptoms of arsenical poisoning. Mercury (0.008 to 0.01 Gm.) yellow mercurous iodide. 1/8 to 1/6 grain may also be used by mouth after each meal or by intramuscular injection in doses of $\frac{1}{8}$ to $\frac{1}{4}$ grain (0.008 to 0.016 Gm.) every other day. Bismuth in oil intramuscularly 0.2 Gm. weekly is also effective. The patient must be carefully observed for evidence of stomatitis or renal irritation. For patients with subjective sensations, bland mouth washes may be used, and there should be careful attention to mouth hygiene and removal of infected foci. The use of vitamin B complex capsules of high potency is also of value in the treatment of lichen planus. In some cases, especially when hypertrophic papules are present, it may be necessary, in order to secure complete effacement of the papules, to treat them locally by "dotting" with the fine pointed cautery. Roentgen rays in fractional doses (in trained hands) are also of value in the resistant cases.

HEART AND CHEST SOUNDS

To the Editor:—I am interested in the physical interpretations of heart and chest sounds. 1. I should like to know what the wave frequency of normal heart tones generally is. Apparently they fall in the lower limits of cycles, but I would appreciate being informed whether there have been any studies made of the range and the results of such studies? 2. I would also appreciate any available information on chest sounds and the wave range in which they fall.
M.D., Milwaukee.

ANSWER.—Vibrations normally arising within the chest, in both audible and subaudible frequency ranges, are produced by movements of the lungs and the wall of the chest, movements of air within the lungs, contractions of cardiac and respiratory muscles, the action of the cardiac valves and the motion of the blood in the heart and large blood vessels. The chest sounds actually heard on auscultation, however, are determined by the transmission losses and distortion occurring in the air spaces and tissues of the chest and in the stethoscope or other instrument used and by the varying response of the human ear to different frequencies of sound waves. It is not sufficiently appreciated that the instrument used for auscultation, as well as the human ear itself, modifies the true nature of the sounds produced in the chest.

The results obtained by a number of investigators have shown that the frequency range encompassed by the normal heart sounds extends from 5 or 10 cycles per second in the subaudible region up into the audible range to a little more than 100 cycles per second. Frequency components of the normal heart sounds above this level are negligible. Cardiac murmurs, however, extend up to 650 cycles per second, with occasional small components as high as 1,000 cycles per second. Other chest vibrations and sounds extend from less than 5 up to about 1,000 cycles per second.

Further information on heart and chest sounds may be found in the following articles:

Mannheimer, Edgar: Calibrated Phonocardiography, *Am. Heart J.* 21: 151 (Feb.) 1941.

Rappaport, M. B., and Sprague, H. B.: Physiologic and Physical Laws That Govern Auscultation, and Their Clinical Application, *ibid.* 21: 257 (March) 1941.

TONSILLECTOMY FOR ACUTE NEPHRITIS

To the Editor:—What is the status of tonsillectomy for chronic tonsillitis during the course of an acute hemorrhagic nephritis? A man aged 36 had acute nephritis following mild scarlet fever. He was treated conservatively for six weeks with improvement, but there was still evidence of red blood cells and traces of albumin in the urine. He was seen at a midwestern clinic, and at that time albumin and casts with a few red blood cells were still present. This was two months after the onset. Tonsillectomy was performed for "badly infected tonsils." There had been no history of quinsy; there had been infrequent sore throat of moderate severity preceding the onset of nephritis. Tonsillectomy during active renal inflammation seems contrary to what I was told in medical school or to all the reading I have done since.
M.D., Montana.

[This question was referred to two internists, whose respective replies follow.—Ed.]

ANSWER 1.—The removal of tonsils, even though infected, during the active course of hemorrhagic nephritis is a procedure open to question and in a great majority of instances is not recommended. This type of nephritis follows or coincides with streptococcal infection in a high percentage of cases. During the active stage, as evidenced by red blood cells and albumin in the urine, the probability of stirring into reactivity a subsiding source of infection with consequent fresh activity of the renal lesion must be considered.

The wisest course would be to exercise patience until the disease has reached a latent stage, when sources of infection

can then be attacked. In this respect two further considerations must be remembered: removal of focal infection rarely helps in the chronic stage of hemorrhagic nephritis, and the fact that the patient in consideration had had no quinsy does not preclude badly infected tonsils.

ANSWER 2.—Several aspects are involved in the question of tonsillectomy for acute glomerulonephritis. The first of these is the relation of infected tonsils to the etiology of acute nephritis. There is no doubt concerning the high incidence and great importance of beta hemolytic streptococcus infections of the tonsils and adjacent tissues of the nasopharynx in the initiation of acute renal inflammation (Longcope, W. T.: Pathogenesis of Glomerular Nephritis, *Bull. Johns Hopkins Hosp.* 45:335 [Dec.] 1929). Furthermore, the persistence of acute or subacute nephritis and the occurrence of exacerbations of the disease in the early stages are definitely associated with residual or renewed hemolytic streptococcus infection of the upper respiratory tract, including the tonsils (Winkenwerder, W. L.; McLeod, Neil, and Baker, Myles: Infection and Hemorrhagic Nephritis, *Arch. Int. Med.* 56:297 [Aug.] 1935). Therefore, early removal of infected tonsils is theoretically indicated. However, actual experience has shown that recovery from acute glomerulonephritis takes place in the vast majority of children and to a lesser degree in adults without any relation to tonsillectomy or other surgical eradication of infected foci. Nor does tonsillectomy appreciably reduce the incidence of exacerbations or prevent the progress of activity in unhealed acute nephritis (Illingworth, R. S.: Tonsillectomy and Nephritis of Childhood, *Lancet* 2:1013 [Nov. 11] 1939). It is also established that, once recovery has occurred from acute nephritis, further renal inflammation of this type practically never develops in spite of repeated hemolytic streptococcus infections of the same type that led to the original nephritis (Loeb, Emily N.; Lytle, John D.; Seegal, David, and Jost, Elizabeth L.: Permanence of Recovery in Acute Glomerulonephritis, *J. Clin. Investigation* 17:623 [Sept.] 1938). The conclusion is inescapable that the decision to remove the tonsils in a patient with acute nephritis should be based largely on general hygienic and local reasons rather than on the theory of favorably influencing the renal disease. The time chosen for the operation should depend on the patient's general and renal status. In the case described there can be no criticism in view of the lapse of two months from the onset of the nephritis and the definite subsidence of the inflammatory process. Careful studies have shown that tonsillectomy during the course of acute nephritis may cause transient increase in proteinuria and hematuria but no reduction in renal function nor any permanent damage (Page, I. H., and Alving, Alf: Effect of Nasopharyngeal Operations on Renal Function, *J. Clin. Investigation* 11:1037 [Sept.] 1932). Finally, it should be noted that it is extremely unusual for chronic nephritis to follow an acute nephritis secondary to scarlet fever. Therefore, complete recovery is highly probable in this case.

BICHLOROACETIC ACID FOR SKIN LESIONS

To the Editor:—What is the safety of bichloroacetic acid (Bichloroacetic Acid Kahlenberg, Kahlenberg Laboratories, Two Rivers, Wis.) for the removal of various types of cutaneous lesions? Is this method of treating certain cutaneous lesions by escharotics generally accepted?

Stanley B. Weld, M.D., Hartford, Conn.

ANSWER.—Bichloroacetic acid is one of the three chloroacetic acids. The bichloroacetic and monochloroacetic are said to be stronger than the trichloroacetic acid, but most clinical experience has been with trichloroacetic acid. When these are used as topical applications the main danger rises in their local effect and not in the possibility of systemic absorption. This, of course, presumes that they are used on relatively small areas. They have a limited use for the removal of certain benign types of cutaneous blemishes. The ones most commonly treated with these agents are xanthelasma, warts, possibly papillomas and certain varieties of nevi. In the last two instances extreme care must be exercised that a correct diagnosis has been made and, if there is any doubt, such substances should not be used until a biopsy has been performed. In the use of these acids for the treatment of xanthelasma, care must be taken that they are not used too vigorously lest there be cicatricial contracture with resulting ectropion. In general these agents should not be used on persons who have keloidal tendencies, as all chemical escharotics are more apt to produce keloids than surgery or electrodesiccation. As far as is known, the Kahlenberg Laboratories market only two preparations, the other being a colloidal gold preparation which is advocated by the promoters for the treatment of cancer. The Council on Pharmacy and Chemistry has indicated on several occasions in the pages of THE JOURNAL that there is inadequate evidence on which to base a claim for the usefulness of this preparation in the treatment of cancer.

POSSIBLE LESION OF SPINAL CORD

To the Editor:—A man aged 48 has been suffering from asthma since childhood. He now finds complete relief through inhalations of an epinephrine spray. He has always been a heavy smoker and drinker. About a year ago he began to complain of numbness in his left foot extending up to the knee and over to the right side over the whole of the lower part of the abdomen. There was a sensation as if a rope were tied around his waist, and his stomach felt as if filled with concrete. Physical examination revealed a moderate emphysema due to his asthma. The blood pressure was 160 systolic and 96 diastolic, the blood picture was normal. The stomach contents showed free hydrochloric acid in abundance and some occult blood in the final specimens. Roentgenograms of the skull and spine appeared normal. Neurologic examination showed an unsteady gait and a mild degree of rombergism. There was definite ataxia of both lower limbs and a degree of hypalgnesia over both legs up to the umbilical level, with almost complete loss in the perirectal region completing a saddle distribution about the rectum, and yet with this the sensation over the scrotum and penis was normal. His reflexes were hypoactive but there were no pathologic reflexes. There was also a diminution of touch sensation over the lower extremities, but position sense was normal. The pupils were regular and equal and they reacted to light, and his fundal vessels were mildly sclerotic. Lumbar puncture showed a pressure of 150 increased to 360 on jugular compression; there was a rapid rise and fall; there was no block. The white cell count was 24. The Pandy test was positive; total proteins were 80; the Wassermann reaction was negative; the colloidal gold 00232000. A diagnosis of avitaminosis due to overindulgence in alcohol was made and he was given a high vitamin diet with large doses of B₁ and B complex intramuscularly and by mouth. He seemed to be improving under this therapy. Of late, however, he has been complaining of numbness and inability to walk without having to stop and rest. I am wondering whether this is not due to arterial spasm of the legs, and if the epinephrine spray and tobacco are in part responsible for his condition.

M.D., New York.

ANSWER.—In spite of the excellent account and the extensive tests made, one cannot do more than to suggest diagnostic possibilities. Epinephrine and tobacco may well cause spasm and narrowing but would not account for the cell and protein increase in the spinal fluid or for the fact that the symptoms and signs are confined to the lower half of the body. One must suspect the existence of a lesion either of the spinal cord itself or of its roots and membranes. Practically speaking one may be dealing with a form of meningomyelitis, spiral arachnoiditis or spinal cord tumor. If the condition of the legs grows worse and especially if sphincter disturbances or localized pain should develop, it would be justifiable to inject air or iodized oil, as there may be some deformity of localizing value even in the absence of spinal block. If signs of tumor should become quite definite it would, of course, become justifiable to do an exploratory laminectomy without air or injection of iodized oil.

SUBMINIMAL REACTIVE DOSE

To the Editor:—What term do you suggest to indicate an amount of either toxin or a suspension of micro-organisms that just fails to produce signs of the respective disease; in other words, a term analogous to "sublethal dose"?

M.D., Buffalo.

ANSWER.—A variety of terms might be used, such as sub-infective dose, subtoxic dose or subminimal reactive dose (as in the Römer reaction). Experimentally the assay of toxicity or infectivity takes the form of a determination of the probability of an observable reaction expressed as a function of the dose by the use of the formula of inverse probability. The end point in the determination of a minimal dose is that at which half the animals show an observable reaction, while half do not; a subminimal dose would necessarily be defined in terms of a similar ratio or as a probability obtained by extrapolation. Standard terms apply to minimal amounts necessary to produce the reaction, since a maximum which will not produce a reaction is inferential rather than directly determinable. In one instance, that of the Limes Nul or L₀ dose of diphtheria toxin, the definition is in terms of no observed reaction; the largest amount of diphtheria toxin that, when mixed with 1 unit of antitoxin, will, on the average [sic] give no observable reaction when injected subcutaneously in 250 Gm. guinea pigs. In practice, however, this amount is usually recorded as that dose which, tested in this way, produces a minimal local edema.

LIQUID PETROLATUM AND INTESTINAL IRRITATION

To the Editor:—Are there any postmortem reports on the gross and microscopic condition of the intestine in frequent users of liquid petrolatum? It would be interesting to know how they compare with those of nonusers.

E. P. S. Miller, M.D., Chicago.

ANSWER.—Liquid petrolatum is thought to be a definite irritant to the intestinal mucosa. So far there have been no reports on histologic findings in postmortem examinations when the patient had taken liquid petrolatum habitually. Some observers feel that histopathologic changes are to be expected. At the

1941 meeting of the American Medical Association Morgan exhibited a photograph of the rectal mucosa of a patient who died of pneumonia. This patient was known to have taken liquid petrolatum habitually for a long time. The specimen was thoroughly washed with physiologic solution of sodium chloride and then immersed in Kaiserling's solution for two days. A photograph was then taken of the mucosa of the rectum, which had been cut open and pinned out on a board. The epithelium was still coated with dirty, oily feces.

It has been claimed that the presence of the tenacious oil might induce hemorrhage in rectal wounds. In the light of more recent investigations, however, the tendency to bleed may be more closely related to vitamin K (oil soluble) deficiency and interference with prothrombin concentration, which has been so well demonstrated in women who take liquid petrolatum during the latter months of pregnancy.

FUNCTIONAL STOMACH AND INTESTINAL DISTRESS

To the Editor:—A patient not of the nervous type complains of feeling full and uncomfortable after a small meal. The discomfort lasts for about three hours. Roentgenograms of the gastrointestinal tract do not reveal any evidence of organic disease, but they do show hyperactivity of the stomach and the intestine with spasticity of the entire colon. Examination after a barium sulfate enema shows no abnormalities except evidence of spasticity. What treatment may be tried to relieve the feeling of fullness after eating and what drugs may be used to slow up the intestine and relieve the spasticity? M.D., New York.

ANSWER.—The symptoms and data given suggest, in the absence of an organic pathologic condition of any kind, a functional disturbance of the digestive tract. Various terms have been applied to this symptom complex, such as irritable bowel, functional bowel distress and irritable colon. Other terms, such as mucous colitis, spastic colitis and cathartic colitis, emphasize a predominant characteristic of the syndrome in a particular individual. When gastric symptoms predominate, many physicians prefer the designation gastric neurosis. Fundamentally the nature of the disturbance is apparently an unusual or abnormal irritability of the gastrointestinal tract resulting in a disruption of the normal peristaltic rhythm. This hyperirritability apparently may come about in either of two ways or from combination of the two. The first of these is the effect of irritants within the lumen of the digestive tract, as that from the continued ingestion of laxatives or irritating foods. The second is the nervous state of the patient. A real "irritable bowel" or "gastric neurosis" is thought by many to be dependent on a preexistent nervous condition, such as may result from severe emotional stress, particularly fear.

Adequate therapy, therefore, depends primarily on the correct diagnosis and on a correct evaluation of the patient as an individual. This involves an appraisal of physical, social and psychic factors. These problems are discussed in considerable detail in an article by Palmer (*The Functional Bowel*, *M. Clin. North America* 22:139 [Jan.] 1938). Reassurance and superficial psychotherapy may do much to decrease hyperirritability in the gastrointestinal tract when this is due to a functional disturbance. Cathartics should be avoided. The principle of dietary management is that of attempting to find a diet which will produce firm, formed stools. The details of such diets can be found in the reference cited.

Pharmacologic therapy is useful chiefly as an adjunct to the therapy outlined. Tincture of belladonna in doses of 10 drops taken four times daily is of value. Taking sedatives, such as bromides or phenobarbital, either in small divided doses several times daily or in a single larger dose at night tends to insure greater physical and mental rest, which is perhaps one of the most important aims in the treatment of this condition.

THICKNESS OF SKULL OF NEGROES AND WHITE PERSONS

To the Editor:—I would appreciate an answer to the following questions: In general are Negro skulls thicker than those of white persons? What effect, if any, does thickness of the skull have on a boxer's ability to bear head blows or "knockout" blows?

S. B. Kleinman, M.D., Alexandria, La.

ANSWER.—The vault bones (frontal, parietals, occipital) of the Negro skull are, on the average, a millimeter or so thicker than those of the white skull. The range of variation in the two groups, however, is so great that there is considerable overlapping. A "knockout" punch on the skull, accompanied by a slight concussion caused by raising intracranial pressure, is quite improbable. The fighters dodge and weave so that direct

head blows are rare; most such blows are glancing. A true knockout "on the button" is delivered on the chin. The blow travels along the body of the mandible to contact of mandibular condyle with the temporal bone, in the mandibular fossa, where bone is relatively thin.

ERGOT POISONING OR WORRY

To the Editor:—Two months ago an unmarried woman aged 26 stated that five months previously she had been given 1½ ounces of ergot, which quantity she had taken in divided doses over a period of twenty-four hours. Since that time she has complained of "crawlers" under the skin, tingling of the hands and feet, stasis of the blood in the hands and feet, enlargement of the superficial veins and swelling of the face and neck; in fact she has all the nervous manifestations of ergot poisoning. The ergot did not produce the abortion. She claims it was produced by sitting over "hot onions" for three days. Are there any cases on record in which this small amount of ergot has produced symptoms which have lasted as long as eight months? The woman has read medical literature on ergot poisoning, and I am of the opinion that this has produced all her trouble but I want to give her the benefit of the doubt.

M.D., Ohio.

ANSWER.—The preparation of ergot used was probably the fluidextract, which is most commonly employed. The official dose is 2 cc., although much larger doses are frequently given. If this was the preparation taken, the patient received 45 cc., or about twenty-two official doses in the course of twenty-four hours. No mention is made of any of the immediate results in ergot poisoning, such as nausea, vomiting or diarrhea. Ergot, although somewhat irregularly absorbed from the gastrointestinal tract, usually gives a prompt response. It acts in from fifteen to thirty minutes and the action lasts about a half hour. Recovery from severe ergot poisoning may take several days. As far as can be ascertained, there are no records of a similar quantity of ergot exerting its effects over a period of eight months. As suggested by the correspondent, the present complaints are in all probability due to her worrying about having used the drug.

SILICON AND SILICON HALOGENS

To the Editor:—What information can you furnish regarding industrial poisoning by silicon gas? R. S. Barry, M.D., Niagara Falls, N. Y.

ANSWER.—Air borne suspensions of the element silicon might be construed as gaseous in the fume liberated on electric furnace treatment. The fine particles of such fumes collect as long cobweb-like streamers in flues, rafters and the like. Animal injection experiments have demonstrated that silicon in this form is inert and incapable of producing either acute or chronic tissue changes other than phagocytosis. The same result was observed with coarser particles 1 to 3 microns in diameter. Silicon tetrafluoride is a colorless, irritating gas. The tetrachloride has a suffocating odor and is used in the preparation of smoke screens. Several other halogen compounds are known. Of the organic silicates that might be inhaled as vapors, the ethyl silicate has been found to be highly toxic on injection into animals.

APHONIA IN TELEPHONE OPERATORS

To the Editor:—It is stated that telephone operators lose the use of their voice after about three years, and that they especially notice difficulty in singing. The constant monotone of the voice was suggested as a possible disturbing factor. I am unaware of any literature bearing directly on the voice problems of telephone operators. Could you tell me if the condition described is common in such an occupation and furnish references for further study?

Lloyd K. Rosenfold, M.D., Los Angeles.

ANSWER.—Loss of voice does not commonly occur as an occupational disability in telephone operators. Careful inquiry into this question discloses that there is no significant loss of voice after three years or more of service. Reference to the monotone as being a possible cause of this disability is open to question. The operators are trained to avoid a monotonous voice, to vary their speech and to use as pleasant a voice as possible. No reference has been found in the literature to this supposed disability in telephone operators. C. H. Watson, medical director of the American Telephone and Telegraph Company has said: "Long-continued active use of the voice over difficult circuits might result in a certain amount of hoarseness and if a person is a singer, after such a period of this work there might be some difficulty in embarking on a period of singing. However, I cannot see that telephone operating itself is an industrial hazard of this type and instances of this sort do not occur frequently enough to establish it as an object of concern for the industry."

OBSTIPATION IN MULTIPLE SCLEROSIS

To the Editor:—A woman aged 27, who had acute multiple sclerosis, is having considerable urinary and bowel retention. Her urinary retention is overcome after considerable straining, but the bowel retention is the biggest problem. Her general therapy has consisted of alpha-tocopherol, thiamine hydrochloride and quinine hydrochloride. She goes two to five days without a bowel movement, at which time enemas are given. The enemas consist of soapsuds, plain physiologic solution of sodium chloride, glycerin and magnesium sulfate. The results from any one of these enemas are poor; at times she does not even expel the liquid inserted. Further, cathartics by mouth, including castor oil, are ineffectual. Any suggestions you can offer will be greatly appreciated.

M.D., Michigan.

ANSWER.—The urinary and bowel difficulties in multiple sclerosis may at times be a serious problem. In many instances the already existing problem is made worse by the giving of numerous medicinal remedies as well as enemas. There is no drug known that will directly affect the bowel as it exists in multiple sclerosis. Under such circumstances one is dealing usually with a diminished motor stimulus resulting in either obstipation or constipation. The following is suggested: A diet consisting of 1½ pounds of liver two or three times a week, with eggs, milk, fresh vegetables and fruit. Cereals should not be used. Light abdominal massage in the rectal direction of the colon should be done daily for three to five minutes. Liquid petrolatum in doses of 1 ounce (30 cc.) should be given every night. No cathartics, laxatives or enemas should be given at any time.

NITRATES AND SEXUAL POTENCY

To the Editor:—A robust man aged 42 complains of the recent loss of sexual power accompanied with attacks of palpitation of the heart. He believes that he may be being fed potassium nitrate and wishes to know if there is any test possible to determine this. A careful physical check-up reveals no cause of his present condition excepting perhaps a moderately chronic specific urethritis, which has been controlled recently by sulfathiazole.

M.D., Indiana.

ANSWER.—It has been shown that potassium nitrate in large amounts may have a slight depressant action. But to obtain any anaphrodisiac action, such large quantities would be required that an extremely violent gastroenteritis would result. This, together with the associated pain, vomiting and frequently bloody stools would certainly preclude the use of potassium nitrate in any sizable dosage.

Potassium nitrate is readily absorbed and its excretion in the urine is almost quantitative. The usual chemical tests for the potassium ion and the nitrate ion could be made in urine, bearing in mind that normal urine contains from 0.1 to 0.4 per cent of potassium nitrate.

The patient may have developed a sexual neurosis because of his specific urethritis. There is also the possibility that the sulfathiazole has temporarily depressed his sexual powers. It is known to do so during the period of treatment, but as far as can be learned such action does not continue after the drug has been discontinued.

INTRACUTANEOUS ALLERGIC TESTING

To the Editor:—I have received an advertisement of a new intracutaneous method of allergic testing from Multifit, Inc. Is this approved or not by good allergists?

Frank Howard Richardson, M.D., Black Mountain, N. C.

ANSWER.—The technic for intracutaneous testing was described by Rappaport and Hecht in 1936 (Vial Syringe Technic for Intracutaneous Tests, *J. Allergy* 7:161 [March] 1936). The Multifit "Bartos" Cartridge System consists in a modification of the "carpule" used by dentists as a container for local anesthetics. There is nothing revolutionary in this method of testing. It is merely the substitution of the "carpule" for the tuberculin syringe as a container for the allergen. Its convenience is in a large, rather than a small, practice. One possible objection is the greater difficulty of controlling the size of the wheal as compared with the ease with which this can be done with the tuberculin syringe. This, however, can be satisfactorily accomplished after considerable experience. The main objection to the claims in the advertisement is that the emphasis is on the container (the cartridge, as it is called), rather than on the allergen inside the container. Nothing is said of the quality of the testing materials. Granted that the physician has experience in the technic of doing and interpreting the intracutaneous tests, the reliability and standardization of the allergens, rather than the syringe used, are the important elements for successful work.

COFFEE AND TEA IN GOUT

To the Editor:—Are coffee and tea permissible in gout? Opinion seems to be at variance on this point. Most of the textbooks emphatically state that they contain purine bodies. Hench, however, in *The Journal*, Feb. 8, 1941, page 453, states that "coffee and tea are permissible, being methylated purines which do not form uric acid."

J. Lyman Hurlbut, M.D., Flushing, N. Y.

ANSWER.—Coffee and tea contain methylated purines, but whether these contribute to increased formation of uric acid in the blood of man is an open question. The increased urinary excretion of uric acid after coffee or tea, as claimed by some, does not prove that the methylated purines have been converted into uric acid because the diuretic action of coffee or tea may have been responsible. Some well known authorities state that caffeine is not converted into uric acid in man. Others state that only a small percentage is demethylated. The entire problem has not been sufficiently investigated by the newer methods to answer the question satisfactorily. It would seem wise to advise patients with gout to use coffee and tea moderately, if at all.

DIET AND CIRRHOSIS OF LIVER

To the Editor:—I have read with interest the editorial on "Diet and Cirrhosis of the Liver" in the Nov. 1, 1941 issue of *The Journal*. As a resident in medicine I treated many cases of hepatic cirrhosis and adhered to the high carbohydrate, low protein, low fat diet suggested by Albert Snell of the Mayo Clinic. This diet is discussed in the latest treatises on therapeutics. Snell's objections to a high protein diet are that: 1. A greater load is thrown on the liver in that a larger amount of deamination must be done than would be necessitated with a low protein diet. 2. Bile salt production is increased on a high protein diet; the latter is disadvantageous if any degree of hepatocellular jaundice exists. I am familiar with Dr. Ravdin's work on the protective effect of a high protein diet preoperatively in promoting better wound healing in cases in which a predisposition to hypoproteinemia exists. However, it is established that the reversed albumin-globulin ratio frequently encountered in hepatic cirrhosis is entirely uninfluenced by dietary protein. I would appreciate any comments on this problem.

Robert G. Lehman, M.D., Lieut., M. C., U. S. N. R., San Diego, Calif.

ANSWER.—The effect of a high protein diet in preventing or retarding the experimental production of cirrhosis of the liver, as considered in the editorial, has no relation to the problem of the treatment of cirrhosis after the clinical or experimental condition had been established. The editorial suggested the value of protein in the detoxication of poisons used to produce experimental liver damage; this query deals with the effect of added protein on an already diseased liver. The editorial does not discuss the latter problem.

SULFONAMIDE COMPOUNDS PROPHYLACTICALLY

To the Editor:—Have any controlled experiments been reported on the ingestion of sulfathiazole or other sulfonamide drugs as a preventive of infection, as for gonorrhea? Has any army utilized chemotherapeutics for this purpose? Is there any objection pharmacologically to adding tablets of sulfathiazole to the list of mechanical and topical applications for the prevention of gonorrhea after exposure?

Herman Goodman, M.D., New York.

ANSWER.—As far as is known no controlled experiments dealing with the use of a sulfonamide compound as a preventive in gonorrhea have been carried out. The armed forces of the United States have not given official approval to the use of a sulfonamide compound as a prophylactic, nor have reports on the subject originating in foreign military establishments been found. One of the principal requisites of a prophylactic agent is that it may be repeatedly and frequently used without injury to the user. As the prolonged and indiscriminate use of sulfathiazole may lead to troublesome toxicity it would seem to be inadvisable to recommend its use until such time as its prophylactic efficiency may have been determined.

HAIR AND PERMANENT WAVE

To the Editor:—A woman aged 27, whose physical examination is entirely negative, complains that her hair is naturally straight and that although she has had many permanent waves they last only until the hair is wet. A so-called finger wave lasts only a few hours. Can you suggest any treatment for this or the cause for it?

M.D., Wisconsin.

ANSWER.—This is a common trouble, apparently an inherent difficulty which the hairdressers are unable to overcome. The difficulty lies in the nature of the hair and the limitations of the curling process, not in any constitutional peculiarity of the patient.

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BRUCELLOSIS SPONDYLITIS

TREATMENT BY PHYSICALLY INDUCED HYPERPYREXIA

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Spondylitis is probably the most common complicating disorder of the bones and joints referable to undulant fever. The first proved instance of an actual suppurative lesion in the spinal column from which brucella organisms were cultured was reported in 1932 by Kulowski and Vinke.¹ Six more cases of brucellosis spondylitis have been reported in the English literature.² In the foreign literature, however, there are numerous reports of brucellosis infections of the spinal column. Piero Palagi³ in 1934 gathered 29 cases of brucellosis spondylitis from the literature and added 17 cases of his own.

Most authors agree that spondylitis as a complication of undulant fever is most likely to occur several months after the onset of the febrile state; but cases of brucellosis have been reported in which localization in the spinal column developed as early as three weeks and as late as one year after the original infection. The patient may even appear to have recovered from the systemic disease only to become affected by the spinal complication of it at some later date. It has been suggested by Bishop² that spondylitis in such cases is a local recurrence of brucellosis probably caused by failure of the systemic forces to achieve immunization to the organism. Patients who are farmers, veterinarians, dairymen, butchers, packing house employees and also those who give a history of ingestion of raw milk and present the chief complaint of backache should be suspected of having brucellosis spondylitis if other clinical factors supporting such a suspicion are also present.

The treatment of brucellosis spondylitis resolves itself, of course, chiefly into measures directed against

the systemic infection. To this end numerous procedures have been employed, including the intravenous injection of mercurochrome,⁴ acriflavine hydrochloride⁵ or metaphen,⁶ administration of azosulfamide,⁷ injection of typhoid vaccine and other fever producing foreign proteins,⁸ specific brucellosis vaccine or immune serum, administration of generalized diathermy, ultra-violet or infra-red radiation,⁹ generalized roentgen therapy and physically induced hyperpyrexia. The local treatment of brucellosis spondylitis may be surgical; that is, incision and drainage of an abscess may be necessary, or spinal fusion may be performed, as was done in 2 cases reported by Kulowski. But in the majority of the cases reported in the world literature symptomatic measures have been employed during the acute stage and supportive measures in the convalescent period. Local diathermy, infra-red and roentgen rays have been employed.¹⁰

The evaluation of any method of treatment of brucellosis is difficult because the periods of fever which characterize the condition occur irregularly, and febrile periods alternate with long afebrile pauses. Instances of spontaneous recovery or remission are numerous. Furthermore, many workers believe that the manifest form of brucellosis may pass into a latent asymptomatic one. Since the etiologic agent is seldom isolated in any specific case, the validity of a diagnosis that rests only on the presence of a febrile syndrome and brucella agglutinins may be open to question. Nevertheless their presence gives strong presumptive evidence of the existence of the disease.

In 1936 Prickman and Popp¹¹ reported the first cases of undulant fever in which physically induced hyperpyrexia was employed, and in 1938 Prickman, Bennett and Krusen¹² reported a series of 21 cases so treated, with seventeen "cures" and four failures.

4. Todd, M. L.: Two Cases of Malta Fever Treated with Mercurochrome, *Mil Surgeon* 61:34-35 (July) 1927.

5. Thurber, D. S.: The Results of the Use of Acriflavine Hydrochloride in the Treatment of Undulant Fever, *Canad. M. A. J.* 23:665-668 (Nov.) 1930.

6. Fortnes, A. C.: Undulant Fever Treated with Metaphen, *Minnesota Med.* 16:335 (May) 1933.

7. Neumann, C. Z.: Treatment of Undulant Fever with Prontosil, *Brit. M. J.* 2:342-344 (Aug. 13) 1938.

8. Ervin, C. E., and Hunt, H. F.: The Diagnosis and Treatment of Undulant Fever, *I. A. M. A.* 109:1966-1971 (Dec. 11) 1937. Carpenter, C. M., and Boak, Ruth A.: The Treatment of Human Brucellosis: A Review of Current Therapeutic Methods, *Medicine* 15:103-127 (Feb.) 1936.

9. Flippin, H. F.: Treatment of Undulant Fever: A Report of Five Cases Treated with a Specific Polyvalent Serum, *Ann. Int. Med.* 12:232-235 (Aug.) 1938. Angle, J. E.: Treatment of Acute and Chronic Brucellosis (Undulant Fever), *J. A. M. A.* 105:939-942 (Sept. 21) 1935. Feldmann, L.: Physical Treatment in Brucellosis, *Brit. J. Phys. Med.* 12:157 (Nov.) 1937.

10. Izar, Guido, and Moretti, Pasquale: Die Wirkung der kurzen Wellen auf den Verlauf des Maltafiebers, *Klin. Wchnschr.* 14:46-47 (Jan. 12) 1935.

11. Prickman, L. E., and Popp, W. C.: Treatment of Brucellosis by Hyperpyrexia Induced by the Simpson-Kettering Hypertherm, *Proc. Staff Meet., Mayo Clin.* 11:506-510 (Aug. 5) 1936.

12. Prickman, L. E.; Bennett, R. L., and Krusen, F. H.: Treatment of Brucellosis by Physically Induced Hyperpyrexia, *Proc. Staff Meet., Mayo Clin.* 13:321-328 (May 25) 1938.

From the Division of Medicine (Dr. Prickman) and the Section on Physical Therapy (Dr. Krusen), Mayo Clinic.

1. Kulowski, Jacob, and Vinke, T. H.: Undulant (Malta) Fever Spondylitis: Report of a Case Due to *Brucella melitensis*, Bovine Variety, Surgically Treated, *J. A. M. A.* 99:1656-1659 (Nov. 12) 1932.

2. Bishop, W. A., Jr.: Vertebral Lesions in Undulant Fever, *J. Bone & Joint Surg.* 21:665-673 (July) 1939. Kulowski, Jacob: Undulant (Malta) Fever Osteomyelitis and Arthritis, *Surg., Gynec. & Obst.* 62:759-763 (April) 1936. Snyder, C. H.: Spondylitis in Undulant Fever: A Report of Two Cases, *J. Michigan M. Soc.* 34:224-228 (April) 1935. Steindler, Arthur: Orthopedic Complications of Brucellosis, *J. Iowa M. Soc.* 30:256-257 (June) 1940.

3. Palagi, Piero: Le localizzazioni vertebrali nella febbre ondulante, *Chir. d. org. di movimento*, 20:31-56, 1934.

None of these patients had osseous lesions. Since 1938 3 patients who had brucellosis spondylitis have been treated by physically induced hyperpyrexia at the Mayo Clinic. We here present reports concerning these 3 patients (1) because brucellosis is infrequently considered clinically as a possible cause of infectious spondylitis and (2) because of the gratifying results we obtained with the treatment we employed.

The effect of hyperpyrexia on the treatment of brucellosis has never been satisfactorily explained. Certainly elevation of the temperature alone is not the cause of the cure, because Thompson, Sheard and Larson¹³ showed that the organisms which cause brucellosis are not killed in vitro at a temperature of 107 F. sustained for a period of twenty-four hours. It has been suggested that the effect of hyperpyrexia is one of activation or heightening of the intrinsic protective mechanism of the body.

The procedure arbitrarily employed at the clinic in the administration of this treatment is as follows: Three sessions of fever are given, separated by an interval of three days and with a sustained rectal temperature of 105 to 106 F. for five hours; the patient is kept in the hospital during the period of treatment (Elkins and Krusen¹⁴).

REPORT OF CASES

CASE 1.—A white man aged 50, a lawyer, admitted to the clinic on March 8, 1938, stated that in September 1937 he had experienced the sudden onset of fever and chills and had simultaneously experienced a pain in the lower part of his back which had persisted unabated ever since. He said that his back was very stiff and painful on motion. There was some extension of pain to the groins, but sciatica was not present. Pain interfered with his sleep at night. Anorexia was pronounced, and the patient stated that he had lost 15 pounds (7 Kg.) since the onset of his illness. A low grade fever in which his temperature had ranged from 99 to 100 F. had been present since September 1937. He had been drinking unpasteurized milk.

The patient on admission was pale and somewhat poorly nourished. His back was flat, with loss of normal lumbar lordosis. The paravertebral muscles were spastic, motions of the lumbar portion of the spinal column were limited to



Fig 1 (case 1).—Brucellosis spondylitis at time of admission. *a*, anteroposterior view and *b*, lateral view of lumbar vertebrae, showing destruction of the posterior inferior border of the fifth lumbar vertebra, with narrowing of the lumbosacral interspace.

grade 3 (on a basis of 1 to 4) and tenderness was present over the sacrovertebral juncture.

Results of urinalysis and the flocculation test for syphilis were negative; the content of hemoglobin was 13.3 Gm. per

13. Thompson, Luther; Sheard, Charles, and Larson, Nora: The Effect of Heat at 107 F. (41.8 C.) on Various Bacteria, *Proc. Staff Meet., Mayo Clin.* 11: 319-320 (May 13) 1936.
14. Elkins, E. C., and Krusen, F. H.: Clinical Results of Fever Therapy, *Arch. Phys. Therapy* 20: 346-353; 376 (June) 1939.

hundred cubic centimeters, the sedimentation rate was 111 mm. in one hour (normal rate 20 mm. or less in one hour) and the result of the agglutination test for the organisms of brucellosis was positive in a dilution of 1:1,280. A roentgenogram of the thorax was reported as being negative. Roentgenograms of the lumbar portion of the spinal column were reported to show "some destruction of the posterior inferior



Fig. 2 (case 1).—Brucellosis spondylitis five months after admission. *a*, anteroposterior view and *b*, lateral view of lumbar vertebrae, showing advanced repair of the destructive lesion.

border of the fifth lumbar vertebra with narrowing of the lumbosacral joint space" (fig. 1 *a* and *b*).

The patient was admitted to the hospital and received one treatment in the Kettering hypertherm; a sustained rectal temperature of 105 F. was maintained for five hours. Two days later a second treatment was started but had to be discontinued because of blistering of the skin over the anterior costal margins. No further treatment was administered at this time.

Following the first treatment, the patient obtained much relief from the pain in the lower part of his back. He himself stated that the relief seemed unbelievable. He was kept in the hospital for nine days. His temperature remained normal after the fourth day.

One month later he returned to the clinic for examination. It was noted at this time that normal lumbar lordosis had been restored; tenderness was much diminished over the sacrovertebral juncture; but persistent spasm of the paravertebral muscles was present and there was some slight limitation of motion of the lumbar portion of the spinal column. The patient had gained 5 pounds (2 Kg.) and was practically symptom free. Roentgenograms of his spinal column showed destructive arthritis to be less in extent than had been the case when the previous roentgenograms were made. He received at this time one fever treatment in the Burdick cabinet; rectal temperature was maintained at 105 F. for five hours.

The patient was last seen in July 1940, at which time he felt entirely well. He had gained 15 pounds (7 Kg.). Motions of the lumbar portion of his spinal column were very free; he was able to touch the floor with his fingertips without bending his knees. Roentgenograms of the spinal column revealed an advanced reparative process of the destructive lesion, with almost normal restoration of the vertebra involved (fig. 2 *a* and *b*).

CASE 2.—A white man aged 52, an agent for an oil company, admitted to the clinic on July 20, 1939, complained of pain and stiffness of the dorsal and lumbar portions of his spinal column. He stated that he had first noticed a "catch in his back" one and a half years previous to the time of consultation; it was felt usually after a long automobile ride. He had been in bed for a few days in the fall of 1938 because of rather severe backache. He had never experienced sciatica and usually had obtained prompt relief from the pain in his back by resort to rest in bed. In February 1939 he had had a severe chill; his temperature had increased to 105 F. Since 1939 he had had recurrent bouts of fever, which alternated with periods of normal temperature. The fever had not been

altered by a course of sulfanilamide prescribed by his physician at home. The pain in his back usually felt better immediately after an episode of high fever. He had lost 20 pounds (9 Kg.) during the year and a half prior to his coming to the clinic. He commonly drank unpasteurized milk.

On physical examination the patient was seen to have flattening of the entire back, with rather severe paravertebral muscular spasm. Motions of the thoracic and lumbar portions of the spinal column were limited to grade 3 in all directions. There was slight tenderness over the sacrovertebral juncture and also tenderness in the thoracolumbar region. Chest expansion was 2 inches (5 cm.).

Results of urinalysis and the flocculation test for syphilis were negative; the content of hemoglobin was 14.8 Gm. per hundred cubic centimeters; leukocytes numbered 11,000; the sedimentation rate was 42 mm. in one hour; results of the agglutination test for the organisms of typhoid and paratyphoid fever were negative, but results of the agglutination test for the organisms of brucellosis were positive in a dilution of 1:640. Roentgenograms of the thoracic and lumbar portions of the spinal column showed only localized hypertrophic changes of the ninth and tenth thoracic vertebrae, with calcification of the intervertebral disks of the ninth and tenth and the tenth and eleventh thoracic vertebrae. Results of a roentgen examination of the thorax were reported as being negative.

The patient was admitted to the hospital for fever treatment. On two days a sustained rectal temperature of 105.4 F. was maintained in the Kettering hypertherm for five hours each day. Following these two treatments the patient felt entirely relieved of pain in his back; he refused to submit to the third fever treatment of the series, although it was recommended.

One week after returning to his home in Texas the patient experienced a recurrence of the pain in his back. He returned at once to the clinic and submitted to a series of three more treatments in the Kettering hypertherm. During each treatment a sustained rectal temperature of from 105.2 to 105.4 F. was maintained for a period of five hours. Following this series of treatments he again felt entirely well and at the time of this writing had had no recurrence of symptoms of spondylitis.

CASE 3.—A white man aged 20, unemployed, who was admitted to the clinic on Dec. 14, 1939, complained of recurrent attacks of pain in the lower part of the back which had lasted two to three weeks and which had occurred for a period of two years prior to the time of his coming to the clinic. The attack

On physical examination the patient was seen to have a very flat back, with suppression of side motion and flexion referable to paravertebral muscular spasm. Raising of the leg with the knee extended was limited bilaterally. There was not much tenderness on percussion over the spinal column.

Results of urinalysis and the flocculation test for syphilis were negative; leukocytes numbered 7,300 and erythrocytes

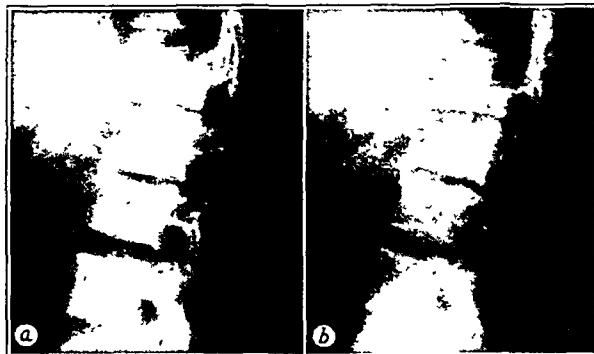


Fig. 4 (case 3).—Brucellosis spondylitis: *a*, lumbar vertebrae immediately following second course of physical fever; roentgenogram made at a date ten days later than the date on which the roentgenogram in figure 3 *b* was made; *b*, appearance four months after second course of physical fever, showing healing of the destructive lesion of the third lumbar vertebra and increased narrowing of the second lumbar interspace.

4,260,000; the content of hemoglobin was 12.4 Gm. per hundred cubic centimeters; the sedimentation rate was 65 mm. in one hour; results of the agglutination test for the organisms of brucellosis were positive in a dilution of 1:1,280. Roentgenograms of the lumbar portion of the spinal column revealed destructive changes in the third lumbar vertebra and compression and wedging of some extent of the second lumbar vertebra, with narrowing of the second lumbar interspace (fig. 3 *a*).

The patient was admitted to the hospital and received three treatments in the Kettering hypertherm; on Dec. 20, 1939 a sustained rectal temperature of 105 F. was maintained for three and a half hours; on December 22 a similar temperature was maintained for five hours, and on December 26 a rectal temperature of 102 to 102.6 F. was maintained for four hours. The excessively high pulse rate (168) accompanying the temperature of 102.6 F. during the last treatment made it inadvisable to attempt to obtain any higher elevation of the temperature at that time.

Following this series of treatments the patient stated that the pain in his back was much relieved. Motion in the lumbar portion of his spinal column was increased 50 per cent as compared to the motion present at his admission. However, some degree of limitation in flexion and some pain in the lower part of the back remained. At dismissal he was wearing a Taylor brace.

The patient returned to the clinic on Jan. 29, 1940. He stated that he had been afebrile until one week prior to his return, at which time he had begun to suffer from a sore throat. He then had experienced fever for the ensuing four days. He was afebrile on admission. Because he still had pain in the lower part of his back (fig. 3 *b*) he was admitted to the hospital, where he received two more fever treatments. The first was administered on Feb. 2, 1940 and the rectal temperature was maintained at 105.2 F. for five hours. The second treatment was administered on February 5 and the rectal temperature was maintained at 104.2 to 104.8 F. for five hours.

Although the patient felt much improved after these treatments, it was thought advisable to immobilize his back in a plaster jacket. He wore this jacket for eight weeks.

At the time of writing of this report, the patient had remained symptom free since February 12 (fig. 4 *a*). On June 18 a roentgenogram of the spinal column revealed that the involved region had healed without fusion and with only moderate narrowing of the disk in the second lumbar interspace (fig. 4 *b*).

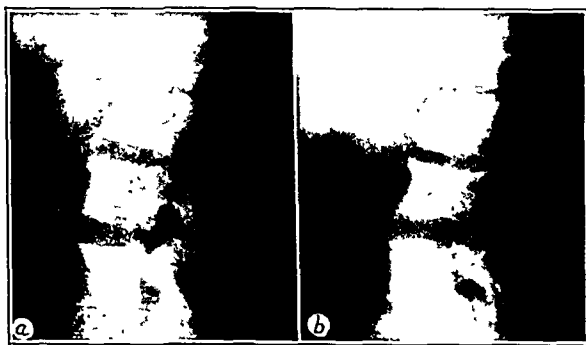


Fig. 5 (case 3).—Brucellosis spondylitis: *a*, at time of admission; lateral view of lumbar vertebrae showing destructive changes of the third lumbar vertebra and compression and wedging of the second lumbar vertebra with narrowing of the second lumbar interspace; *b*, lateral view of lumbar vertebrae six weeks later.

with which he was afflicted at the time of his examination had begun six weeks previously, with severe aching and pain; he had been forced to go to bed and was unable to walk because of pain. At this time he had had a temperature as high as 104 F. and the fever was known to have persisted for the five weeks prior to the time of consultation. He was in the habit of drinking raw milk.

COMMENT

We fully realize that the accuracy of the diagnosis in these 3 cases may be open to some question. The diagnosis in each case is based chiefly on the presence or history of remittent fever, the local signs and symptoms of spondylitis, a high sedimentation rate and the presence of a high titer of specific agglutinins for brucella organisms in the patients' blood. That spondylitis in these 3 cases was caused by the brucella infection is more or less proved (1) by the fact that prompt remission of the symptoms of spondylitis occurred in each case following fever therapy, (2) by the fact that this therapy has been shown to be effective in most cases of brucellosis without bony lesions in which the treatment has been employed at the clinic. Furthermore, evidence that the organisms of brucellosis were present in the 3 cases presented herein is adduced by negative exclusion: physically induced hyperpyrexia has not been effective in control of the symptoms of the common forms of spondylitis, either the atrophic or the hypertrophic types, in which the organisms of brucellosis are not the causative agents.

On the basis of the small series of cases reported here it could not be stated that employment of fever therapy hastens the healing of pathologic lesions in the spinal column in the condition under consideration; but certainly the great diminution in the extent of pain in the back and the lessening of the paravertebral muscular spasm following this treatment would lead to the conclusion that the infectious process was at least arrested by such therapy. The prompt relief which immediately followed the fever treatment in each of these 3 cases could scarcely be said to have been the result solely of coincidental spontaneous remission.

It is recognized that, even if no special treatment is employed, the prognosis as to ultimate healing in brucellosis spondylitis is good. We believe, however, that physically induced fever was of very definite value in the management of the 3 cases previously mentioned. To our knowledge, no patient suffering from brucellosis spondylitis has been so treated previous to this report.

SUMMARY

In 2 of 3 cases of brucellosis spondylitis destructive lesions of the spinal column were present and in 1 the clinical signs and symptoms of acute spondylitis without any significant bony changes were observed. All the patients made a recovery, with demonstrable repair of the bony lesions in 2 cases after a course of physically induced hyperpyrexia.

He Touched Fame and Never Knew It.—Curiously, sulfanilamide waited idly on the laboratory shelves for more than twenty years before its faculty of routing microbes was discovered. It is a synthetic compound, derived from coal tar, and was first made by a young chemist, P. Gelmo, student at a university in Vienna. His synthesis of the substance was published in 1908 in a German chemical journal. The report was offered as thesis in his candidacy for the doctor's degree. Probably no student ever contributed so much in exchange for a doctorate, though neither Gelmo, nor his teachers, nor any contemporary scientist saw anything extraordinary in the addition of one more to the hundreds of derivatives from coal tar. . . . Having achieved his synthetic, Gelmo dropped back into obscurity. Nobody knows what became of him. The files of scientific journals have been searched, and there is no record of any subsequent publication in his name. He touched fame and never knew it.—Gray, George W.: *The Advancing Front of Medicine*, New York, McGraw-Hill Book Company, Inc., 1941.

PRIMARY CARCINOMA OF THE BRONCHUS

AN ANALYSIS OF FIFTY-SIX CASES

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During the past eight years we have observed 56 histologically proved cases of bronchiogenic carcinoma; 37 came to necropsy (an incidence of 2.5 per cent of all necropsies in this period), and in the remaining 19 the antemortem diagnosis was established by biopsy. We have evaluated the clinical and pathologic features of this material.

CLINICAL FEATURES

Age and Sex.—As may be seen in table 1, 88 per cent of the patients were men and the average age was 56, with the youngest patient 30 years of age.

Duration of Illness.—The average interval (table 2) from the onset of the present illness to hospitalization was six and six-tenths months, and the average dura-

TABLE 1.—Age and Sex of Patients

	Total Number	Percentage
Race: White.	51	95
Colored	2	2
Sex: Male.	49	88
Female	7	12
Age: Average	56 years	
Youngest	30 years	
Oldest	70 years	

TABLE 2.—Duration of Illness

	Average	Minimum	Maximum
From onset to hospitalization . . .	6 6 months	1 week	24 months
From hospitalization to death. . .	3 1 months	1 day	27 months

tion from hospitalization until the time of death three and one-tenth months later. It is apparent, therefore, that the disease on the average had consumed two thirds of its span before hospitalization occurred. Moreover, in 22 cases, or almost 40 per cent, the duration of life in this second phase was one month or less. Such figures, we think, indicate the urgent need for an intensive "early diagnosis" educational campaign.

Symptoms and Signs.—The symptoms prior to admission ranged from an acute onset of one week's duration to a maximum of two years. In a significant number, 17 cases, or 30 per cent, the onset was atypical. In 5 instances the symptomatology mirrored an acute respiratory episode. The diagnosis on admission was pneumonia in 4 cases and spontaneous pneumothorax in the fifth. The remaining 12 cases were atypical in that the outstanding symptoms were related to metastatic foci and dominated the clinical story.

The usual mode of onset was insidious (table 3). Cough is by far the most common symptom (91 per cent) and one of the earliest. It is often productive

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and may occasionally have a "brassy" quality; 7 patients had foul expectoration associated with secondary abscess formation. Dyspnea was noted in 59 per cent, and one half of our patients complained of thoracic pain, which occasionally radiated to the shoulder, axilla or arm. As a rule its severity increased as the disease progressed. Frank hemoptysis or blood streaked sputum appeared in 41 per cent and wheezing in 10 per cent. Weakness and weight loss as constitutional manifestations of cancer were noted in 87 per cent. The majority of patients also showed fever during at least part of their hospital sojourn.

The most common abnormal physical signs elicited over the lungs were limitation in motion of the affected hemithorax and dullness or flatness with diminished or absent breath sounds. Occasionally local pressure was evidenced by dysphagia (16 cases), hoarseness (3 cases) or a Horner's syndrome (1 case). We observed central or peripheral nervous system manifestations in 15 cases. Enlarged superficial glands were noted 19 times. In the order of their frequency, the groups of lymph nodes were cervical 7, inguinal 5, supraclavicular 4 and axillary 3. The liver was enlarged in 12 instances. Effusion into the pleural cavity was often noted, and thoracenteses were done in 11 cases. Other findings included distention of superficial veins in the thorax or neck in 4 cases, edema of the face and neck in 4 cases and unilateral edema of the extremities in 3 cases.

DIAGNOSIS

The antemortem diagnosis of bronchiogenic carcinoma can be facilitated by x-ray studies and biopsy procedures. There is no roentgenologic shadow which is absolutely pathognomonic for bronchial carcinoma, but the most commonly encountered appearance is that

mass, and it is these changes together with pleural involvement which contribute largely to the roentgen opacity. Forty cases were considered as showing this combination of pathologic events. It is interesting to report also that in 7 instances a definite abscess cavity



Fig 2—Carcinoma arising in the periphery of the lung.



Fig 1—Carcinoma of the left main bronchus with extension to the superior sulcus area. There is secondary atelectasis and bronchiectasis of the left lung.

of a unilateral density which radiates outward from the hilus. As the disease progresses this density usually becomes lobar or multilobar in extent. The predominant clinical picture and the postmortem findings indicate that inflammatory changes involving the parenchyma and the bronchi occur distal to the tumor

was noted on the film. Mediastinal widening was seen in 9 cases. One patient had a spontaneous pneumothorax on the side of the tumor.

The basic classification of primary bronchial cancers by Rabin and Neuhof¹ into hilar and peripheral is simple and practical, especially as concerns operability. Some may prefer, as Jaffé² has done, to include another anatomic subdivision; namely, tumor arising from a bronchus which occupies an intermediate position between the main bronchus and its finer divisions. In 10 of the 56 cases no chest roentgenograms were available for study. Of the remaining 46 cases the distribution was as follows: hilar or noncircumscribed type (fig. 1), which arise from the main or first division bronchi, 42 cases, or 91 per cent; peripheral or circumscribed type (fig. 2), situated within the parenchyma but which pathologically take origin from smaller bronchi or bronchioles, 3 cases, or 7 per cent; and diffuse nodular carcinomatosis (involving both lungs), 1 case, or 2 per cent. Utilizing all available data, the right side was involved in 30 cases, or 53 per cent, and the left in 25 cases, or 45 per cent; the remaining case, as mentioned, was of the diffuse type. In 5 cases pulmonary tuberculosis was also noted, 3 with quiescent productive infiltration and 2 with cavitation.

Bronchoscopy with biopsy is probably the most important single procedure for diagnosis. Of the total

1. Rabin, C. B., and Neuhof, Harold. A Topographic Classification of Primary Cancer of the Lung: Its Application to the Operative Indication and Treatment. *J. Thoracic Surg.* 4: 147 (Dec.) 1934.
2. Jaffé, R. H.: Primary Carcinoma of the Lung. *J. Lab. & Clin. Med.* 20: 1227 (Sept.) 1935.

of 56 cases, bronchoscopy was performed in 24, or 43 per cent, and in these gross abnormal changes and a positive biopsy section for cancer were noted in 19, or 79 per cent. It is important to remember that negative findings do not rule out intrabronchial disease, for the lesion may be beyond the vision of the bronchoscopist.

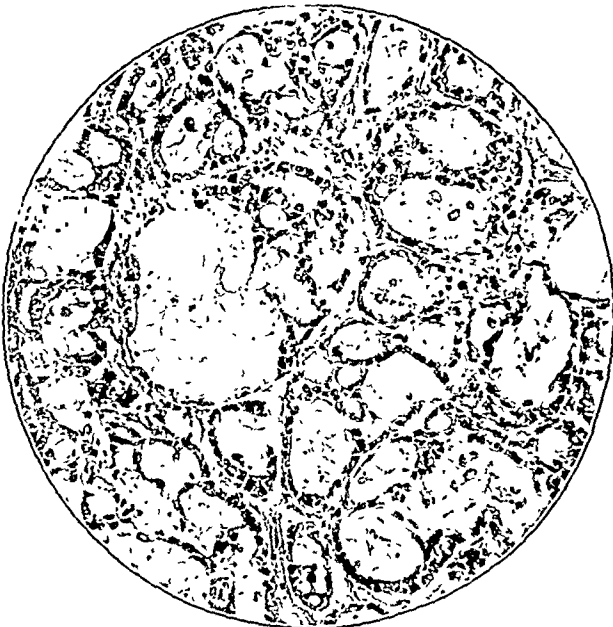


Fig. 3.—Superior sulcus tumor. Parenchyma invaded by numerous glands lined by mucous cells.

In 2 of our cases aspiration biopsy of the lung showed evidence of neoplastic changes on microscopic section. In 4 instances the diagnosis of carcinoma was corroborated by microscopic study of metastatic cervical or supraclavicular nodes. Our experience in finding tumor cells within pleural fluid has been disappointing.

TABLE 3.—Symptoms and Signs

	Total Number	Percentage
Cough.....	50	91
Sputum *.....	40	71
Dyspnea.....	33	59
Chest pain.....	25	50
Hemoptysis.....	23	41
Wheezing.....	6	10
Weakness.....	47	84
Weight loss.....	47	84
Dysphagia.....	6	10
Hoarseness.....	3	5
Neurologic changes.....	15	26
Lymphadenopathy.....	19	34
Hepatomegaly.....	12	21
Superficial veins.....	4	7
Edema of face and neck.....	4	7
Unilateral edema of extremities.....	3	5
Horner's syndrome.....	1	2

* Seven patients had foul sputum.

In 3 patients whose hospitalization period was twenty-four hours or less the diagnosis was made only at autopsy. In 9 other cases incorrect final antemortem impressions were gastrointestinal cancer (probably of the stomach) with metastases in 5 cases, hypertensive or arteriosclerotic heart disease with decompensation in 2 cases, postpneumonic empyema with broncho-pleural fistula in 1 case and Hodgkin's disease in 1 case. Thus an accurate diagnosis checked by histologic section was established clinically in the remaining 44 cases, or 80 per cent of the entire series.

Therapy

In 7 cases of the 56, or 12 per cent, roentgen or radium therapy or both were employed with no beneficial effect. One patient was suitable for a lobectomy, but death occurred from postoperative shock.

Histopathology

The pleomorphic features of primary carcinoma of the bronchus render any histologic classification difficult. We have endeavored to group our tumors under four headings: epidermoid, adenocarcinoma, undifferentiated and mixed types. Epidermoid carcinoma includes those tumors which possess squamous characteristics, with or without pearls or keratin formation. Adenocarcinomas are those tumors which form glands (fig. 3). Mixed tumors form glands and in areas show squamous characteristics. The undifferentiated type includes the anaplastic, small or large round cell, the "oat cell" and the spindle cell tumors (fig. 4). Though we have found this classification to be practical, it is to be emphasized that many sections from various areas are necessary before a microscopic diagnosis can be ventured. It is for this reason that the remarks on histopathology are limited to the 37 cases that came to autopsy.

Normally the bronchi are lined with several rows of four distinct types of cells,³ namely ciliated, goblet, intermediate and basal cells. As the epithelium extends into the bronchioles, the mucosa is thinned out and the ciliated greatly outnumber the goblet cells, which completely disappear in the smaller bronchioles. The lining cells of the prealveolar bronchioles assume a cuboidal shape and form a single layered mucosa with occasional basal cells. This epithelium extends into the pulmonary

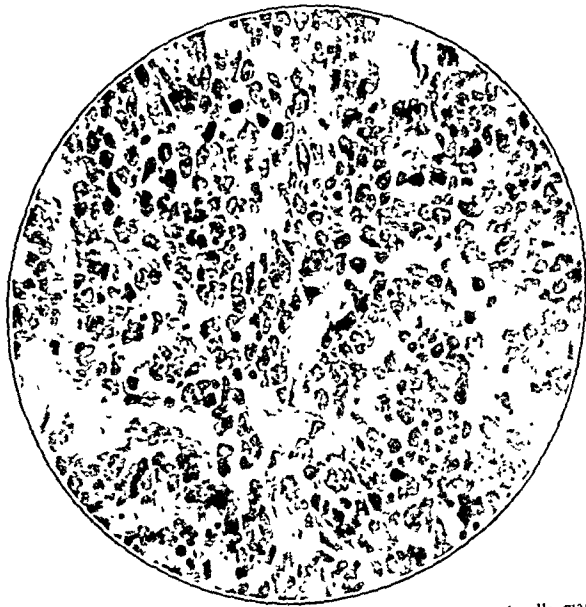


Fig. 4.—Anaplastic carcinoma. These elongated oat shaped cells may be mistaken for spindle cell sarcoma.

alveoli, where it appears as a thin continuous layer of flattened nucleated epithelium. The alveolar epithelium, as pointed out by Konzelmann,⁴ shows no power of regeneration or multiplication when destroyed, and very

3. Miller, W. S. in Cowdry, E. V.: *Special Cytology*, ed. 2, New York, Paul B. Hoeber, Inc., 1932, vol. 1, p. 133.
4. Jackson, C. L., and Konzelmann, F. W.: *Bronchial Carcinoma*, J. Thoracic Surg. 4:165 (Dec.) 1934.

likely a new lining membrane is formed from the basal cell of the bronchioles. The basal cell is the least differentiated and therefore possesses various potentialities for growth and cell differentiation. This postembryonic cell differentiates normally into goblet and ciliated epithelium, as emphasized by Fried.⁵ Weller⁶ believes that its autonomous growth is responsible for the vast majority of lung carcinomas.

Group 1, or epidermoid carcinoma, consisted of 23 cases, or 62 per cent of the total. There were local metastases in regional lymph nodes in 95 per cent and distant metastases in 61 per cent of the cases. Of the latter, the liver was involved 9 times, the myocardium 4, the kidney 4 (one bilateral), the adrenal 6, and the pancreas, ribs and sternum once each.

Group 2, or adenocarcinoma, 4 cases in all, represented 11 per cent of our series. All, or 100 per cent, had local and only 1, or 25 per cent, distant metastases. This case involved the liver, adrenals, abdominal lymph nodes, lower vertebrae, ileum, pubis and femur.

In group 3, or the undifferentiated type of carcinoma, there were 9 cases, or 24 per cent of the total. Local metastases were present in 100 per cent and distant metastases in 88 per cent of the cases. The liver was involved four times and the kidney, adrenal, pericardium and mesenteric lymph nodes once each.

Group 4, or the mixed type, is represented by a single patient (3 per cent of the series), who had regional and distant metastases with involvement of the pericardium, myocardium and kidneys.

No definite correlation was noted in our series of cases between the clinical course, the duration of life and the histopathologic type of the tumor.

An effusion on the same side as the tumor was noted in 59 per cent of these cases. The character of the fluid was serous in 59 per cent, grossly bloody in 23 per cent and frankly purulent in 18 per cent. It is noteworthy that a sanguineous effusion, which is so commonly described as a classic finding, was relatively infrequent in our series.

SUMMARY

1. Primary carcinoma of the bronchus has shown a decided increase in recent years. We have made an analysis of 56 histologically proved cases encountered during the last eight years, 37 of which were confirmed by autopsy and 19 by biopsy. A correct antemortem diagnosis was made in 80 per cent.

2. The high incidence in males was particularly noteworthy. While the usual mode of onset was an insidious one, 30 per cent showed an atypical onset.

3. The cases have been classified from a roentgenologic point of view into three groups: hilar, peripheral and diffuse nodular carcinomatosis. From a histopathologic point of view the 37 cases that come to autopsy were listed as epidermoid carcinoma, adenocarcinoma, undifferentiated carcinoma and mixed type. No significant correlation was noted in our series between the clinical course and the histology of the tumor.

4. The present outlook indicates that thoracic surgery (lobectomy or more often pneumonectomy) offers the best chance for cure. The clinician must contribute his acumen by endeavoring to make a diagnosis of cancer of the lung sufficiently early to permit therapeutic intervention.

SPLENECTOMY IN MEDICAL PRACTICE

REPORT OF THIRTEEN SPLENECTOMIES

EVANS W. PERNOKIS, M.D.

CHICAGO

It has long been recognized that removal of the spleen of man is compatible with a long and healthy life. The spleen, owing to its location and movement with respiration, has been an easy organ to palpate, and it has been found enlarged in many different types of disease processes. The constancy of enlargement of the organ and the lack of any specific etiologic factor for the blood dyscrasias associated with splenomegaly have led to much speculation about the part played by the spleen in the production of these diseases. Recognition of the almost 100 per cent mortality in many of the blood dyscrasias and the lack of any specific therapeutic agent with which to combat these diseases led many of the earlier physicians to resort to removal of the spleen, with the hope that improvement might follow. Much information has been gained by the empirical removal of the spleen. Removal has been shown to have beneficial and probably curative effects in certain of the blood dyscrasias which fail to improve with all known therapeutic agents up to the present time. Other blood dyscrasias, however, have shown no improvement following removal of the spleen, and some seem definitely to have been made worse. With the renewed interest in splenectomy following the rather spectacular results obtained in cases of idiopathic purpura hemorrhagica, it has seemed wise to me to review a few of the facts that are known about the spleen and to state the difficulties encountered in the accurate diagnosis of the diseases benefited by splenectomy. If splenectomy is a beneficial therapeutic agent, then one must recognize the clearcut indications for its use as well as some of the dangers. It is also of greatest importance to recognize, after careful consideration of the functions of the spleen, that the improvement which follows splenectomy is still unexplainable.

FUNCTIONS

The functions of the spleen have been, to say the least, very vague. There are, however, certain functions which have been fairly well worked out, and the following are the most common functions ascribed to the spleen:

1. The spleen as a hemopoietic organ. It has long been known that the spleen in the embryo, along with the liver, assumes the chief role in the production of the cells of the blood. At birth this function is lost to the spleen and liver and is taken over by the bone marrow of the flat bones of the body and the vertebrae. In times of stress the spleen is thought to be able to reassume this function in adults. Normally in adults the spleen is thought to supply lymphocytes and monocytes to the general circulation. The large numbers of reticulo-endothelial cells in the spleen are thought by some to play some role in the fat metabolism of the body, especially that of cholesterol. They are also in some way thought to take part in the production of antibodies, but the mechanism is extremely uncertain.

2. The spleen has been assumed for years to be the organ most actively involved in the destruction of the red blood cells. Experimentation, however, does not fully bear out this view. Blood drawn from the splenic

⁵ Fried, B. M.: Primary Carcinoma of the Lung, Baltimore, Williams and Wilkins Company, 1932.

⁶ Weller, C. V.: The Pathology of Primary Carcinoma of the Lung, Arch. Path. 1: 478 (March) 1929.

artery and vein fails to show in the hands of many investigators any difference in urobilinogen content, which would be the case if active destruction took place in the spleen. Special stains have also failed to demonstrate any increase in the iron content of the spleen which would be likely to follow if the red cells were destroyed in the spleen. There is also extremely slight evidence that there is active phagocytosis of the red cells in the spleen. Phagocytosis in the endothelial cells of the spleen has been shown for both red and white cells but not to a sufficient degree to make this a great function of the spleen. It has been supposed in cases of purpura hemorrhagica that the spleen destroys the platelets too rapidly, but no evidence for this has been demonstrated in the spleens removed from patients with purpura hemorrhagica. No pathologic alteration has been noted in the spleens removed from patients with the aforementioned condition. In the case of congenital hemolytic jaundice, the red cells have an alteration in their resistance to salt solution, hemolyzing at higher salt concentrations than normal blood cells. They also tend to change their shape and become what is commonly termed spherocytes. Removal of the spleen, however, does not always change the fragility test or the shape of the cells present, but the patients are definitely improved or cured following splenectomy.

3. The great vascularity of the spleen has been long known, and one of the common functions ascribed to the spleen is its ability by its rhythmic contractions to regulate the blood flow of the gastrointestinal track during digestion. In extreme oxygen want, as seen in severe anemias, at high altitudes and in carbon monoxide poisoning, the spleen pours out its reserve red cell supply to meet the emergency.

4. Naegle has for years suggested that the spleen in some as yet unknown way has a hormonal action. He suggested that some substance is liberated in the spleen which has a hemming action on the bone marrow. Removal of the spleen permits overactivity of the bone marrow and an outpouring of immature cells of the red and white series and the platelets into the peripheral circulation. This is what actually happens when one removes the spleen of a patient afflicted with purpura hemorrhagica, congenital hemolytic icterus, or, in a few cases, splenic anemia. The histologic structure of the spleen obtained at operation in these three conditions shows no definite structural changes which are characteristic and which would tend to throw light on the local mechanism as an etiologic factor for the diseases. At the present time it seems to me that the spleen, if active in producing these diseases, does so by some internal secretion which hems the action of the bone marrow, or by the destruction or alteration of some chemical constituent of the blood which normally stimulates the bone marrow.

DIAGNOSIS

From this discussion it appears evident that removal of the spleen is not based on any sound physiologic or pathologic basis but rather on the clinical observation that patients afflicted with congenital hemolytic jaundice, idiopathic purpura hemorrhagica and anemia resulting from obstruction of the splenic vein improve when the spleen is removed. In the absence of any better and simpler therapeutic agent for the treatment of these diseases I resort to removal of the spleen. Since these three conditions are the ones in which one might look for improvement following splenectomy, one must be as nearly right as possible in one's diagnosis before

resorting to the operation, which is still a serious operation even in the hands of expert surgeons. A few important points for the diagnosis of each of the three mentioned conditions are the following:

1. The diagnosis of congenital hemolytic jaundice is made from the clinical history and the following laboratory procedures:

(a) A severe anemia complicated with jaundice is present with red blood cells that tend to be microcytic and are termed spherocytes. Reticulocytes are increased in number and nucleated red blood cells are often found in the peripheral circulation. The white blood cell count is usually slightly elevated.

(b) The most important laboratory finding in this disease is the alteration in the fragility test. Normally red blood cells hemolyze in salt concentrations ranging from 0.42 to 0.34 per cent sodium chloride. In congenital hemolytic jaundice the hemolysis begins at higher concentrations, as 0.50 per cent sodium chloride. This alteration in fragility does not always disappear after removal of the spleen, but in spite of its persistence the patient improves clinically.

(c) The icteric index is increased and the van den Bergh test shows an increase in the indirect reaction. A positive direct van den Bergh reaction means that some complication is present.

(d) The urine shows an increased amount of urobilinogen with no bilirubin present, while the stools show adequate bile.

(e) The tests of hepatic function in the early stages are normal and only in the late stages when complications arise are there any abnormalities noted. Surgery should be resorted to before there is any evidence of damage to the liver.

(f) Puncture of the bone marrow in this condition gives further confirmatory evidence by showing a decided preponderance of the erythroid series over the myeloid, though in general the marrow appears hyperactive in both series. There are no abnormal types of cells present which aid in the diagnosis excepting the spherocytes.

2. The diagnosis of idiopathic purpura hemorrhagica is very difficult to make and requires great care. It is important that all forms of symptomatic purpura be excluded. It is also important that other blood dyscrasias which simulate purpura be clearly excluded before splenectomy is done. In addition to the clinical history, the following laboratory procedures aid in the diagnosis of idiopathic purpura hemorrhagica:

(a) The simplest procedure is the bleeding time, which may be done by puncturing the finger or ear and collecting drops of blood every few seconds until the cessation of blood flow. Normally this stops in from three to five minutes, while in idiopathic purpura hemorrhagica it is considerably prolonged.

(b) The coagulation time, which may be determined simply by means of a capillary tube, shows normal coagulation time in purpura and a considerably prolonged coagulation time in hemophilia.

(c) The clot retraction time, which is done by drawing a few cubic centimeters of blood from a vein into a test tube, shows the blood from a patient with purpura hemorrhagica to have lost its power to retract. The clot remains spongy for many hours. In cases of hemophilia the clot retracts slowly but normally.

(d) The blood platelets in idiopathic purpura hemorrhagica are considerably diminished. In my experience

the simplest way to count the platelets is on a moist preparation. Brilliant cresyl blue is spread on a slide and a drop of blood is overlayed so that it spreads out evenly. The number of platelets in 1,000 red blood cells are counted and from the value of the red cell count the platelets are calculated. In my experience this is more satisfactory than are the dilution methods or the magnesium sulfate slide method. Normally by this method I find from 250,000 to 350,000 platelets. In cases of purpura hemorrhagica they are noticeably diminished, and when the value falls below 50,000 bleeding tendencies are common.

(e) Prothrombin determinations have shown values in most instances which are higher than normal.

(f) Blood chemistry determinations have been done for calcium and phosphorus and for nonprotein nitrogen values. The latter eliminates uremia as a cause of symptomatic purpura.

(g) Sternal punctures have been done and varying results have been noted. Many feel that in the typical type of idiopathic purpura hemorrhagica there are normal or increased numbers of megakaryocytes found in the bone marrow which show qualitative changes. This in my experience and in the hands of many others has not been the case. I have not found increased numbers of megakaryocytes in my cases of purpura and do not feel that it is obligatory to get those marrow determinations before making the diagnosis. I believe that a marrow puncture should be done in these cases because I wish always to eliminate the two important conditions aplastic anemia and aleukemic leukemia, which are extremely difficult to differentiate from purpura hemorrhagica.

3. Splenic anemia and Banti's disease have been two disease entities for which splenectomy has been widely advocated. They are now recognized to be two stages of the same disease. In addition to the anemia, the frequent hemorrhages associated with the disease have been the reason for the recommendation of splenectomy. It has long been recognized, however, that splenectomy does not stop the bleeding, and many patients have returned with hemorrhages after the spleen has been removed. The recent work of Thompson and Whipple has demonstrated that in this disease syndrome there is an increase in the pressure of the splenic vein which in most instances results from obstruction in the liver or pancreas, but in a smaller number of cases there is no cause found. Their experience with a large number of cases has shown that splenectomy is of value in the cases in which there is no damage to the liver and in which no esophageal varices are present. The ideal type of the disease for operation is that in which there is increased tension of the splenic vein without demonstrable pathologic changes of the liver. This type is very difficult to diagnose before operation. These observations, however, are important and should make one cautious in resorting to radical treatment with splenectomy in this disease. The diagnosis of Banti's disease or splenic anemia must be made largely from the history and the physical examination. The blood findings in contrast to the two previously mentioned conditions are not specific. One usually finds a moderate secondary anemia with a low white blood cell count. The color index is 1 or slightly above, and the red blood cells seem well filled with hemoglobin but are not always of the macrocytic type. There are no specific types of cells in the blood smear which aid in the diagnosis, and the differential tends to show an increase

in the lymphocytes. Bone marrow findings are those of a slightly hypoplastic marrow with no abnormal distribution of the blood cells. Gastric bleeding, an enlarged liver and decreased hepatic function have been definite indications for conservative treatment in this type of disorder.

RESULTS

Ten patients have submitted to splenectomy during the past four years at the Presbyterian Hospital and 3 at the Cook County Hospital Hematology Service during the first five months of this year. Six of the 10 patients operated on at the Presbyterian Hospital were definitely diagnosed as having idiopathic purpura hemorrhagica. Five of the 6 patients were girls ranging in age from 12 to 23 years, and the sixth was a youth aged 21.

Three of the girls had severe menstrual bleeding as the most prominent symptom and failed to respond to any form of medical treatment including daily transfusions. It was evident from the course of the disease that a state of remission would be unattainable before operation, and when all the evidence was weighed for and against splenectomy removal of the spleen was decided on. The red blood cell count in all 3 cases was lower than 3,000,000 at the time of the operation, and no platelets could be demonstrated. Immediately after the operation, the patients stopped bleeding and began to show significant increase in the platelets and white blood cells and gradually in the hemoglobin level and red blood count. These 3 patients are still in good health and have had no recurrences.

A fourth girl was very ill, with a count of 2,000,000 red blood cells and profuse bleeding from the uterus, as well as from the nose and gums, which my associates and I were unable to check by frequent transfusions and other medical means. This patient at operation showed well defined adhesions of the spleen to the diaphragm, with profuse bleeding during the operation. The patient left the operating room alive but died several hours later from shock and loss of blood. Autopsy showed much hemorrhage into the diaphragm and peritoneal cavity.

The fifth patient, aged 22, who had a purpuric history which dated back to childhood, showed a few large petechiae as the only symptom at the time she appeared for examination. The hemoglobin content and the red blood cell and white blood cell counts were normal. The platelets on several examinations ranged between 50,000 and 75,000. She was contemplating matrimony in the immediate future and I thought it best to advise splenectomy during the interval of hematologic remission rather than wait for a period of relapse. The patient made an uneventful recovery and has been cured both symptomatically and hematologically since her operation.

The sixth patient with purpura hemorrhagica, the youth aged 21, recovered from the splenectomy and felt well for several months. There was a recurrence of the original symptoms and the patient died about four months after the operation. In the operative notes an accessory spleen is described as being present, but no mention is made about its removal at operation or in the pathologic description.

Thus 4 of the patients with idiopathic purpura hemorrhagica are still living and are well. One died at the operation and 1 died later, possibly of the same disease due to hyperplasia of the accessory spleen noted at the operation but not removed.

Three patients with congenital hemolytic jaundice were operated on and the patients improved at once and are still well. Two interesting facts were noted in 2 of these cases. One patient, a young girl aged 8 years, showed in addition to the usual manifestations a gall-bladder full of stones and a considerably diminished liver function test with the rose bengal dye. The van den Bergh test also showed a positive direct reaction and the icteric index was *much higher than is usual* for these cases. The patient had cirrhotic changes grossly at the operation and a more stormy convalescence than did the other 2 patients. Two large accessory spleens were removed along with the regular spleen at the operation, and though the patient is still showing evidence of hepatic damage she has been free from the blood symptoms and her blood count has remained normal.

A second patient improved significantly after the operation and was well for two years, at the end of which time he came back to the hospital because of lymphadenopathy of the neck. A biopsy showed benign hyperplasia of the lymph gland, which probably resulted from the compensatory process following removal of the spleen. The lymph glands are often enlarged following splenectomy to compensate for the loss of lymphoid tissue present normally in the spleen.

The third patient in this series made an uneventful recovery and has been well for two years.

I had 1 patient with a syndrome which was most likely early splenic anemia without any hepatic damage present. This patient improved considerably from a hematologic point of view following the operation but died on the fourth day after the operation from aspiration pneumonia.

At the Cook County Hospital in the hematology service 3 patients have submitted to splenectomy during the past four months. A man aged 22 entered the hospital with severe anemia of undetermined origin and bone marrow which on several examinations showed hypoplasia. This patient failed to improve with frequent large transfusions and all other forms of medical therapy. Although the blood picture was somewhat compatible with aplastic anemia, the prolonged bleeding time and the complete absence of platelets, as well as the progressively fatal course of the disease in spite of intense therapy with transfusions, led us to decide on splenectomy. A bone marrow puncture immediately preceding the operation, after many transfusions, showed in contrast to two previous marrow punctures an increased number of cells which appeared to be lymphoid in nature but which might well have been small myeloblasts. This may have been an indication of extreme effort on the part of the bone marrow to compensate for the aplasia. Removal of the spleen was followed by immediate recovery with an increase in the number of platelets and red blood cells and in the hemoglobin value. The patient six months after the operation is well and shows a normal picture hematologically.

The second patient, a girl aged 18 years, had always been in good health until one month before she entered the hospital with a hemoglobin content of 20 per cent and a red blood cell count of 1,290,000. Platelets were normal and no abnormal cells were noted in the differential. Many nucleated red cells were present in the peripheral circulation, and the reticulocyte count was increased to 15 per cent. The icteric index was 12. The fragility test showed hemolysis beginning at 0.5 per cent sodium chloride. Urine showed increased

urobilinogen. All the findings were compatible with congenital hemolytic anemia excepting the lack of spherocytes. Splenectomy was performed and was followed by an uneventful recovery after a stormy convalescence from a postoperative pneumonia. The patient has made a complete recovery hematologically and at the present time is well.

The third patient, a woman aged 46, with a history of profuse menstrual bleeding for many years, entered the hospital with severe bleeding and severe anemia. A diagnosis of idiopathic purpura hemorrhagica was made. The patient's spleen was removed. There has been complete recovery following the splenectomy.

The results thus show that 3 of 13 of our patients, or 23.1 per cent, died following splenectomy. In searching for the cause of death one should consider the following factors: Did we make the proper diagnosis in our cases? In the 2 that came to autopsy, the preoperative diagnoses were confirmed, and the causes of death were found to be aspiration pneumonia in 1 and postoperative hemorrhage and shock in the other. Permission for autopsy on the third patient was not obtained, but the similarity of the clinical picture during the relapse preceding death to the one prior to the operation makes me feel that the recurrence may have been due to the presence and hyperplasia of the accessory spleen which was seen at operation and, owing to the condition of the patient at the time, could not be removed. Possibly a second operation should have been performed during the time of improvement following the first operation.

CONCLUSIONS

1. Splenectomy at the present time is indicated in three medical conditions: (a) congenital hemolytic jaundice, (b) idiopathic purpura hemorrhagica and (c) early stages of splenic anemia.

2. It should be realized that splenectomy is still being done on an empirical basis and not on any pathologic or physiologic basis. Since it has been shown that only patients afflicted with these three diseases are the ones who improve with splenectomy, great care must be given to the proper diagnosis.

3. Conservative medical treatment should first be tried on all patients and splenectomy resorted to only after all efforts have failed to induce a state of remission by medical means. Many lives will be saved by having a splenectomy done during a state of relapse, when all efforts to induce a remission have failed and the patient's condition appears to be in the terminal stage.

4. If splenectomy is decided on, the following considerations are of the greatest importance:

- (a) The fact should be recognized that splenectomy is still, even in the hands of expert surgeons, a serious operation. The high vascularity of the organ and the tendency to hemorrhage, accompanied by the debilitated condition of the patient as a result of the anemia, require not only accuracy but also speed in the surgical management of these patients.

- (b) Careful preoperative and postoperative care are very essential. Transfusions are given freely before operation as well as during the operation if necessary. All details of careful treatment before and after surgery are heeded.

- (c) A careful search should be made for accessory spleens during the operation, and if the condition of the patient does not permit their removal at this time they should be removed when the clinical condition of the

patient permits. One of our patients I feel certain died as a result of hyperplasia of the accessory spleen noted during the operation but not removed. Unfortunately permission for autopsy to confirm this belief was not obtained. If these accessory spleens are looked for, they will be found more frequently.

(d) It should also be borne in mind that removal of the spleen is accompanied by hyperplasia of the lymphoid and reticulo-endothelial tissue elsewhere in the body to compensate for the splenic loss. It is therefore not uncommon to have patients return after a splenectomy with hyperplasia of the lymph nodes which is due to a compensatory reaction.

6 North Michigan Avenue.

STAPHYLOCOCCUS AUREUS PNEUMONIA

WITH SPECIAL REFERENCE TO ITS OCCURRENCE AS
A COMPLICATION OF INFLUENZA

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Primary staphylococcic pneumonia has been adequately described as a clinical entity. Chickering and Park¹ reported 155 cases of *Staphylococcus aureus* pneumonia occurring during the influenza epidemic of 1918. At this time there were 8,100 patients with influenza at Camp Jackson, S. C., approximately 1,400 of whom later developed inflammatory changes in the lungs. The picture, as described, was one of overwhelming sepsis, the temperatures ranging from 104 to 106 F. with frequent remissions. A peculiar "cherry red indigo blue cyanosis" was a regular accompaniment of the picture. Physical signs were diffuse and surprisingly sparse in view of the extensive consolidation on roentgenographic examination. The sputum was described as being friable, purulent and of a dirty salmon pink color resembling anchovy sauce or the "contents of an overripe furuncle"; on culture this yielded *Staphylococcus aureus* as the predominating organism. Because of technical difficulties, few blood cultures were taken, and two were positive for *Staphylococcus aureus*. Many patients showed a leukopenia, but the majority had a normal white count. Many of those with leukocytosis had complications such as empyema or pericarditis. Of the 155 only 2 recovered; 12 died between the first and the fifth day and 73 between the sixth and the tenth day. Pathologically the lungs were not as voluminous as in those cases in which death was due to streptococcic pneumonia; usually the dependent parts were involved. The pleural surfaces showed many petechiae. On section, areas did not stand out as in bronchopneumonia following measles. There were innumerable small abscesses from 1 to 10 mm. in size. Rapid coalescence of the abscesses occurred in some patients, and there was an attempt at limitation by the formation of connective tissue. Of interest was the low incidence of empyema, 3 cases occurring in their series.

More recently, Reimann² reported 6 sporadic cases of *Staphylococcus aureus* pneumonia, in 4 of which recovery occurred. One of his patients had preexisting

asthmatic bronchitis, 2 contracted the disease during an influenza-like epidemic, 1 had had a sore throat, 1 was a pregnant woman with chronic glomerular nephritis and uremia, and the last was a 3 month old infant who presented a feeding problem. In these cases also fever was remittent, cyanosis well defined and bacteremia seldom noted. Abscesses developed in those who lived long enough; in 1 on the fifth day; in another, small milary abscesses developed twenty days after onset; in still another, typical chronic lung abscesses developed with foul sputum. Cohen³ has called attention to the disease as it occurs in children and stresses its predilection for infants.

My associates and I observed 5 cases of *Staphylococcus aureus* pneumonia. These occurred at the time of a brief epidemic of acute respiratory disease, during which influenza A⁴ virus was isolated from a fatal case and from 1 of our cases of influenza uncomplicated by pulmonary changes.⁵ At this time a larger number of cases of staphylococcic pneumonia were observed at another clinic in this city.⁶ These cases are of interest because (a) we have evidence that influenza virus infection preceded their pneumonia and (b) we feel that chemotherapy had a definite effect on the course of the disease.

From Sept. 1, 1939 through March 31, 1940 there were 60 cases of pneumococcic lobar pneumonia, 1 case of pneumonia due to a pneumococcus which could not be typed, and 1 case of *Staphylococcus aureus* empyema and pneumonia in this hospital. During a comparable period in 1940 to 1941 there were 53 cases of typed pneumococcic pneumonia, 2 cases of "atypical pneumonia," 12 cases of pneumonia for which a definite cause could not be established and 5 cases of *Staphylococcus aureus* pneumonia. All of the latter cases occurred during a period of three months immediately following the influenza epidemic.

CASES IN WHICH INFLUENZA VIRUS INFECTION WAS PROVED

CASE 1.—N. B., a youth aged 19 years, entered the medical service on Jan. 18, 1941. He was well until one week preceding entry, at which time he had malaise, generalized aches and slight headache. Five nights before entry a shaking chill occurred. Following this a sharp pain developed in the right lateral chest region on deep breathing. For the next four days he was given sulapyridine, 1 Gm. every four hours, without any appreciable effect. His physician interpreted the chest signs as being due to fluid and consolidation.

Physical examination on entry showed him to be acutely ill, breathing rapidly, with a dusky cyanosis about his lips. The chest showed a moderate scoliosis of the thoracic spine with convexity toward the left. There were signs of consolidation and fluid over the right lower lobe. The significant laboratory findings and the clinical course are shown in chart 1.

On the first day he had a shaking chill with a temperature rise to 105.4 F. He produced no sputum the first day; a throat swab grew rough pneumococci. A chest film on the second day revealed fluid in the right chest, with the lung beneath it coarsely mottled. Two attempts at thoracentesis in the right axilla were unsuccessful. A lung puncture on the third hospital day revealed predominantly coagulase positive *Staphylococcus aureus* with no pneumococci. Blood cultures remained sterile. On the fourth hospital day a diffuse scarlatini-

3. Cohen, P.: Primary Bronchogenic Staphylococcic Pneumonia, M. Clin. North America 22:1473-1494 (Sept.) 1938.

4. Horsfall, F. Jr.: Present Status of Knowledge Concerning Influenza, A. J. Pub. Health 30:1302-1310 (Nov.) 1940.

5. Pearson, H. E.; Eppinger, E. C.; Dingle, J. H., and Enders, J. F.: A Study of Influenza in Boston During the Winter of 1940-1941, New England J. Med. 225:763-769 (Nov. 13) 1941.

6. Finland, M.; Straus, L., and Peterson, O. L.: Staphylococcal Pneumonia Occurring During an Epidemic of Clinical Influenza, Tr. A. Am. Physicians 56:139-146, 1941.

Dr. Charles A. Janeway gave many valuable suggestions.

From the Medical Clinic of the Peter Bent Brigham Hospital, Boston.

1. Chickering, H. T., and Park, J. H.: *Staphylococcus Aureus* Pneumonia, J. A. M. A. 72:617-626 (March 1) 1919.

2. Reimann, H. A.: Primary *Staphylococcus* Pneumonia, J.A.M.A. 101:514-520 (Aug. 12) 1933.

and a few mottled areas in the left. A third examination on the fourteenth hospital day showed no essential change. No fluid developed. Signs remained the same, and the patient died on the seventeenth hospital day. Permission for autopsy was refused.

CASES IN WHICH INFLUENZA VIRUS INFECTION WAS SUSPECTED BUT NO PROOF WAS ATTEMPTED

CASE 4.—I. Bo., a white woman aged 58, a housewife, entered the hospital on Dec. 29, 1940 in coma. She had been well until three days before entry, at which time she felt "grippy" and developed nausea and malaise. The temperature at this time was 102.4 F. and her throat was mildly injected. The following day her chest was clear and her temperature 100 F. Her physician saw her at 10 a. m. on the day of admission. He stated that at that time she looked "toxic" but that he wasn't particularly worried about her condition. To him she did not appear any different from his many other patients with influenza. Because of a few rales at the left base, he began to administer sulfapyridine. At noon she suddenly became comatose and remained in that state, arriving at the hospital at 4:35 p. m.

Physical examination showed her to be well developed and nourished, comatose and in collapse. The temperature was 105 F. (rectal), the pulse rate 160 and the respiratory rate 35. The extremities were cold and extremely cyanotic, with a mottled appearance. The neck was not stiff. The ear drums were normal and the pharynx was not injected. The lungs were resonant throughout with a few fine crepitant rales low in the right axilla. The abdomen was moderately distended. The only pulses obtainable were in the carotid and femoral regions. A lumbar puncture showed normal pressure and no abnormalities in the fluid. The red blood count was 5.69 million per cubic millimeter; hemoglobin, 13.8 Gm. per hundred cubic centimeters and the sedimentation rate 18 mm. per hour. The white blood count was 9,500 per cubic millimeter, with 79 per cent juvenile neutrophils, 18 per cent lymphocytes and 3 per cent monocytes. A blood culture was sterile. The patient was given caffeine with sodium benzoate, and a 10 per cent

On microscopic examination, the marginal alveoli showed a considerable degree of edema, present also in the deeper areas of the lung substance. Beneath the marginal zone were areas where the alveoli contained an exudate of polymorphonuclears, some large monocytes showing phagocytosis of cocci, and red cells in varying amounts. Areas of typical pneumonia, which in some places tended to be confluent, in others patchy, showed a distinct relationship to the bronchi. The septums were considerably congested, not only in pneumonic areas, but also in areas of emphysema and atelectasis where no pneumonic process was present. In some places the polymorphonuclears infiltrated the septums. Asphyxial hyaline membrane formation was seen in some instances, but not very frequently. The bronchi showed desquamation of epithelium, with collections of debris, polymorphonuclears and monocytes in the lumen. A polymorphonuclear leukocytic infiltration occurred in the stroma of the wall. Fibrinous thrombi were present in some of the large vessels.

A postmortem blood culture was sterile. A lung culture yielded *Staphylococcus aureus* and *Hemophilus influenzae* (a rough respiratory strain, not typable).

CASE 5.—W. S., a youth aged 18 years, entered the hospital on March 19, 1941 because of fever of four days' duration. At the onset he felt chilly and was found to have a temperature of 102 F. There was no pain and only slight cough. Two days before entry his temperature was 105 F.

On physical examination the patient did not appear acutely ill. The throat was clear. The lungs were resonant throughout, with numerous coarse moist rales anteriorly and posteriorly. The white blood count on admission was 3,500 per cubic millimeter, with 75 per cent polymorphonuclears, 21 per cent lymphocytes and 4 per cent monocytes. A sputum culture yielded predominantly hemolytic coagulase positive *Staphylococcus aureus*, but a type III pneumococcus was grown from the heart's blood of the mouse in forty-eight hours (streptococci and staphylococci were in its peritoneum). Two blood cultures were sterile. Sputum culture on March 31 again yielded predominantly hemolytic *Staphylococcus aureus*. A film of the chest on the second hospital day revealed coarse mottling through the lower two thirds of the left lung. Temperatures went as high as 104 F. on the second hospital day, at which time sulfathiazole was exhibited, 7 Gm. a day. By the third hospital day the temperature was 102 F. and by the fourth day 99 F. The sulfathiazole dosage was decreased to 3 Gm. for two days and then omitted on the sixth hospital day, at which time the temperature was normal. The white blood count ranged from 2,700 to 3,700 per cubic millimeter. The patient had an uneventful convalescence and was discharged on the tenth hospital day.

SEROLOGIC STUDIES

Repeated serologic studies have shown the significance of rises in the titer of neutralizing antibodies for influenza virus in patients with proved influenzal infections. Neutralizing antibodies increase rapidly after the fifth day of disease and reach a maximum ten to fourteen days after the onset. In an average of four separate epidemics, Horsfall, Hahn and Rickard⁵ found the following titers:

Acute—mean 1:26, lowest 0, highest 1:360.

Convalescence—mean 1:209, lowest 1:6, highest 1:1,444.

The average increase in titer during convalescence was twenty-six times, and any rise exceeding the value for the acute serums by four times was considered significant. Two months after the acute episode the titer of antibodies had fallen but was still five times that during the acute stage. Three months after the acute episode the titer was twice as great, and from eight to twelve months after was 1.5 to 1.3 times as great.⁴ Similar figures have been presented by Francis, Magill and

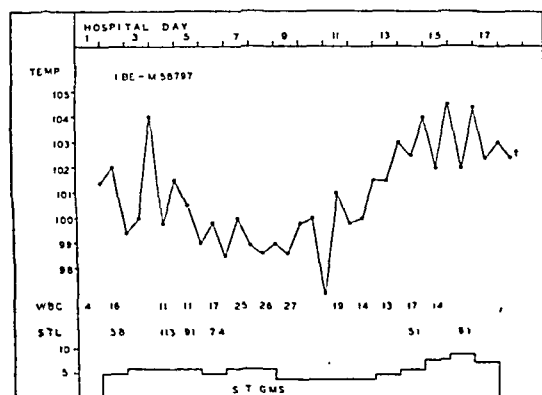


Chart 3.—Clinical course of staphylococcal pneumonia in case 3.

dextrose in saline infusion in the femoral vein. She died at 5:55 p. m., one hour and twenty minutes after admission. The clinical impression was either overwhelming sepsis or influenzal pneumonia.

At autopsy the principal findings were in the lungs. The right lung weighed 520 Gm. and the left 360 Gm. The pleural surfaces showed multiple petechial hemorrhages, many of them coalescing. On longitudinal section the lungs showed a patchy hemorrhagic bronchopneumonia, confluent particularly in the lower lobes of both lungs. The parenchyma immediately surrounding the small bronchioles were hemorrhagic and intensely congested. Consolidation was not a prominent feature, and crepitation was present. The bronchi were intensely congested and hemorrhagic.

⁵ S. Horsfall, F., Jr.; Hahn, R. G., and Rickard, E. R.: Four Recent Influenza Epidemics: An Experimental Study, *J. Clin. Investigation* 19: 379-392 (March) 1940.

Rickard.⁹ In their studies the titers were slightly lower in those patients from whom no virus was obtained.

In eighty-three noninfluenzal respiratory infections, occurring at the time of the influenza epidemic, studies were carried out by Horsfall, Hahn and Rickard.⁸ Of 56 patients with common colds, only 1 patient had an increase in neutralizing antibodies, and he had contact with influenza. In 19 sporadic cases of grip, 5 cases of atypical pneumonia and 4 cases of pneumococcal pneumonia, no rise in titer was noted. These findings are in agreement with those of other workers.¹⁰ In order to determine whether the cases of staphylococcal pneumonia were secondary to influenza, serums taken at different stages of the disease were studied for the presence of neutralizing antibodies for influenza virus.

METHODS

Protection tests against influenza A virus were carried out according to the method described by Francis, Magill and Rickard.⁹

(a) Virus:¹¹ A fresh suspension of mouse lung infected with PR8¹² strain four days previously was used and diluted in broth so as to give 100 or 1,000 minimum lethal doses in the final infecting mixture.

Results of Protection Tests

Patient	Date	Days After Onset	Titer
N. B. (case 1).....	1/30/41	19	640
	4/11/41	90	226
M. K. (case 2).....	1/20/41	6	0
	1/30/41	16	640
	4/15/41	91	108
I. Be. (case 3).....	1/10/41	4	0
	1/25/41	19	142

Figures are in final serum dilutions protecting against 100 minimum lethal doses of virus (N. B., M. K.) or 1,000 minimal lethal doses (I. Be.).

(b) Serums from patients obtained on admission and during various stages of convalescence were stored at 5 C. until tests were run.

(c) White Swiss mice, 3 to 4 weeks old, were used for titration. Serums were diluted serially in physiologic solution of sodium chloride 1:5, 1:10, 1:20, 1:40, 1:80 and 1:160. To 0.3 cc. of each dilution was added 0.3 cc. of the virus suspension so calculated that the infecting dose would contain either 100 minimum lethal doses (M. K., N. B.) or 1,000 minimum lethal doses (I. Be.). The serum-virus mixtures were kept at 37 C. for one-half hour, following which 0.05 cc. of each mixture was inoculated intranasally into each of three lightly etherized mice. The time of death was noted, and at the end of ten days all survivors were killed. All mice were examined post mortem to determine the nature and extent of pulmonary lesions. The protective titer of the serum was calculated from that dilution of serum which protected 50 per cent of the mice against death,¹³ figures being on the basis of final serum dilution in the serum-virus mixture. If complete protection was given in the highest dilution, the next figure was taken as the end point.

9. Francis, T. Jr., Magill, T. P., and Rickard, E. R.: Epidemiological and Serological Studies in Epidemic Influenza, *Am. J. Pub. Health* 27: 1141-1160 (Nov.) 1937.

10. Francis, T. Jr., and Magill, T. P.: Immunological Studies with the Virus of Influenza, *J. Exper. Med.* 62: 505-516 (Oct.) 1935.

11. Drs. J. F. Enders and H. E. Pearson provided the standardized virus suspensions.

12. Francis, T. Jr.: Transmission of Influenza by a Filtrable Virus, *Science* 80: 457-459 (Nov. 16) 1934.

13. Reed, L. J., and Muench, H.: A Simple Method for Estimating Fifty Per Cent End Points, *Am. J. Hyg.* 27: 493-497 (May) 1938.

RESULTS OF NEUTRALIZATION TESTS

The results obtained in the neutralization tests are shown in the table. The complete protection afforded by the first serum of N. B. with a lower titer three months later is adequate proof of influenzal infection, in spite of the fact that no acute serum was titrated. Although titrations in 2 of our cases represent protection against 100 minimum lethal doses, as compared with previously given figures against 1,000 minimum lethal doses, the relative rise in antibody titer is significant and proves that these patients had just had influenza A infection.

RELATIONSHIP OF STAPHYLOCOCCUS AUREUS PNEUMONIA TO INFLUENZA

The close association of *Staphylococcus aureus* pneumonia and influenza has long been appreciated. Fraenkel¹⁴ in 1904 described the clinical course of an infection as influenzal pneumonia in which *Staphylococcus aureus* produced a rapidly fatal pulmonary disease. The large number of cases occurring during the 1918 epidemic as described by Chickering and Park¹ is significant. These authors suggested that whatever was the cause of epidemic influenza it depressed the hemopoietic system to such a degree that organisms normally present in the throat could gain a foothold in the lungs. It would seem that this leukopenia combined with the known destructive effect of the influenza virus¹⁵ on bronchial epithelium would allow invaders to gain a foothold in the lungs. Jordan¹⁶ notes that various observers were impressed with the lack of correlation between clinical influenza and typical lobar pneumonia during the epidemic of influenza in 1918.

Various bacteriologic studies have confirmed the more than incidental relationship between influenza and *Staphylococcus aureus*. Patrick¹⁷ was struck by the high incidence of *Staphylococcus aureus* in the post-mortem lung cultures from patients with influenza in the Malta command in 1918. The organism was found in 84 per cent of the 30 cases that came to necropsy. In a similar series of postmortem examinations, Habbe¹⁸ found pure cultures of *Staphylococcus aureus* in 1.5 per cent, pneumococcus and *Staphylococcus aureus* in 2.2 per cent of the lungs in 131 lobar pneumonia cases. However, in 20 cases of "grip pneumonia" he obtained pure cultures of *Staphylococcus aureus* in 40 per cent. *Staphylococcus aureus* was found in 2 out of 20 cases of whooping cough pneumonia, and this organism was not found in any of 6 cases of pneumonia following measles.

Burgess and Gormley¹⁹ reported 3 cases of rapidly fatal pneumonia during the influenza epidemic in January 1929. These cases in many respects resembled those of Chickering and Park,¹ all proving fatal within forty-eight hours. Leukopenia was striking, and pulmonary consolidation well defined. *Staphylococcus aureus* was recovered from the sputum in all 3 and from the lungs in the case in which autopsy was performed, which showed hemorrhagic bronchopneumonia.

14. Fraenkel, A.: *Spezielle Pathologie und Therapie der Lungenkrankheiten*, Berlin, Urban & Schwarzenberg, 1904.

15. Wolbach, S. B., and Frothingham, Channing: Influenza Epidemic at Camp Devens in 1918: Pathology of Fatal Cases, *Arch. Int. Med.* 32: 571-600 (Oct.) 1923.

16. Jordan, E. O.: Epidemic Influenza, Chicago, American Medical Association, 1927.

17. Patrick, A.: Report of Bacteriological Examinations in Cases of Influenza, Malta Command, 1918, *J. Roy. Army M. Corps* 40: 133-135, 1923.

18. Habbe, K.: Zur Bakteriologie bei Lungentzündungen des Menschen, *Deutsche med. Wchnschr.* 55: 1506-1508 (Sept. 6) 1929.

19. Burgess, A. M., and Gormley, C. F.: Pneumonia in Relation to an Epidemic of "Mild" Influenza, with Report of Three Fulminating Cases Apparently Due to *Staphylococcus Aureus*, *New England J. Med.* 202: 261-264 (Feb. 6) 1930.

A comparable case was reported by Stokes and Wolman,²⁰ who obtained both the influenza A virus and *Staphylococcus aureus* from the lungs at autopsy. The patient was a nurse, aged 20, who had a furuncle three weeks prior to entry, which healed uneventfully. The night before entry she felt chilly. The day of admission her temperature was 101 F. and soon rose to 104.4. A chest film was negative. She became prostrated and died within forty-eight hours. At postmortem examination the lungs were edematous and dark red. There was capillary dilatation, edema fluid in the alveoli, and many gram positive cocci without leukocytes. The bronchioles and trachea were denuded of epithelium. *Staphylococcus aureus* was obtained from an antemortem blood culture and from the lungs at autopsy. By means of ferret passage, they were able to isolate an influenza virus which was neutralized by rabbit serum immune to the PR8 strain. Scadding^{20a} was able to isolate influenza A virus and *Staphylococcus aureus* from the lungs in a rapidly fatal case similar to that of Stokes. Andrewes, Laidlaw and Smith²¹ were unsuccessful in attempts to isolate the virus from the lungs in a case of influenzal pneumonia occurring during a proved influenza epidemic. However, antemortem thrombi of clumps of cocci were found in the pulmonary vessels. From them an almost pure culture of *Staphylococcus aureus* was obtained.

Troisier, Bariety and Brocard²² reported a case similar to our first case. In their case malaise preceded the rather acute onset by two days. They raised the question whether or not these cases represented a complication of grip. Thus it is seen from this brief review that the more than incidental relationship between primary *Staphylococcus aureus* pneumonia and influenza has impressed other workers. However, only in the case of Stokes²⁰ and that of Scadding^{20a} was influenza definitely proved until this year.²³

The demonstration of either a very high titer or of a decided increase in protective antibodies against influenza virus in patients is *prima facie* evidence of influenzal infection. The evidence for this has been presented earlier. Therefore it appears certain that in our patients N. B., M. K. and I. Be., there is definite evidence from the antibody titers that influenza A infection immediately preceded the pneumonia.

Unfortunately, no attempt was made to isolate the virus from the lungs in the fatal case herein reported. However, clinically the case and autopsy findings were similar to those reported in the 1918 epidemic,¹ to those of Burgess and Gormley,¹⁹ to the case of Stokes and Wolman,²⁰ and to the cases reported by Finland, Strauss and Peterson.⁶ McCordock and Muckenfuss²⁴ were able to produce a lobular pneumonia in a small number of rabbits and death within twenty-four to forty-eight hours in a larger number by combining vaccinia virus and *Staphylococcus aureus* for intranasal injection. *Staphylococcus aureus* alone produced insignificant lesions, and virus alone produced a nonfatal disease

characterized by either a hemorrhagic consolidation or an interstitial bronchopneumonia. The lesions of the hemorrhagic type were similar to those seen in patients dying within a few days after the onset of influenza. The virus produced such changes in the lungs that bacteria, which in normal animals incited only limited lesions, were enabled to multiply and spread, causing extensive and fatal lesions. That this is not the only respiratory virus infection which can cause secondary invasion by *Staphylococcus aureus* is indicated by 2 of the cases of "bronchopneumonia, variety X," reported by Longcope,²⁵ from which hemolytic *Staphylococcus aureus* was obtained from the sputum. Although no definite virus etiology was demonstrated in his cases, viruses have been demonstrated in similar cases of atypical pneumonia.²⁶ In 1 of the fatal cases of pneumonia from which a virus resembling the meningo-pneumonitis virus was isolated, staphylococci were cultured from the lungs at postmortem examination.

ROLE OF CHEMOTHERAPY IN STAPHYLOCOCCUS AUREUS PNEUMONIA

In view of the use of chemotherapy in these cases, some comment is pertinent. It appears that there is a group of these pneumonias much more fulminating than others. Chickering and Park¹ had many such cases. Those reported by Burgess and Gormley¹⁹ and by Stokes and Wolman²⁰ similarly are of the same type. Into such a division would fall our fourth patient, I. Bo. From the fulminating nature of these it would appear that chemotherapy might have little to offer, unless perhaps given prophylactically during influenzal epidemics. However, in the other less severe forms I feel that chemotherapy with the sulfonamide derivatives has a definite place. Exactly how long the infection would have lasted in our cases in which recovery occurred is difficult to say in view of the continued elevation due to drug fever. Reimann² states that in favorable cases after three or four weeks the temperature gradually becomes lower and trails off. The case reported by the French workers was similar in many respects to our case which was complicated by empyema.²² Their patient was afebrile only after three months. Pleural drainage was productive of fluid only in the early days of the disease. In our case with empyema (case 1), fever lasted only two weeks and no surgical drainage was necessary. Finland²⁷ reports that of 29 patients with staphylococcal pneumonia treated with sulfadiazine 6 died, 3 of whom had the fulminating type with death in forty-eight hours. Although our figures for recovery are not particularly gratifying and the series is not large, it does seem that chemotherapy definitely shortened the course of the illness in the 3 cases in which recovery occurred.

SUMMARY

1. *Staphylococcus aureus* pneumonia is characterized by a septic temperature, cyanosis, fairly extensive pulmonary consolidation, thick, purulent blood-streaked sputum, high mortality, and a protracted course in nonfatal cases. Empyema or multiple pulmonary abscesses are the most frequent complications. Blood

20. Stokes, J. Jr., and Wolman, I. J.: Probable Synergism of Human Influenza Virus and *Staphylococcus aureus* in a Rapidly Fatal Respiratory Infection. *Internat. Clin.* 1: 115 (March) 1940.

20a. Scadding, J. G.: Lung Changes in Influenza. *Quart. J. Med.* 6: 425-464 (Oct.) 1937.

21. Andrewes, C. H.; Laidlaw, P. P., and Smith, W.: Influenza. Observations on the Recovery of Virus from Man and on the Antibody Content of Human Sera. *Brit. J. Exper. Path.* 16: 566-582 (Dec.) 1935.

22. Troisier, J.; Bariety, M., and Brocard, H.: La staphylococcie pleuro-pulmonaire primitive. *Ann. de med.* 30: 189-210 (Feb.) 1936.

23. In the 1941 epidemic in Boston influenza A virus presumably was isolated from the lungs in a fatal case of staphylococcal pneumonia as reported by Pearson, Eppinger, Dingle and Enders.¹

24. McCordock, H. A., and Muckenfuss, R. S.: The Similarity of Virus Pneumonias in Animals to Epidemic Influenza and Interstitial Bronchopneumonia in Man. *Am. J. Path.* 9: 221-251 (March) 1933.

25. Longcope, W. T.: Bronchopneumonitis of Unknown Etiology (Variety X). *Bull. Johns Hopkins Hosp.* 67: 268-305, (Oct.) 1940.

26. Eaton, M. D.; Beck, M. D., and Peterson, H. E.: A Virus from Cases of Atypical Pneumonia. Relation to the Viruses of Meningo-pneumonitis and Psittacosis. *J. Exper. Med.* 72: 641-654 (May) 1941.

27. Weir, J. M., and Horsfall, F. L., Jr.: Recovery from Patients with Acute Pneumonitis of a Virus Causing Pneumonia in the Mongoose. *J. Exper. Med.* 72: 595-610 (Nov.) 1940.

27. Finland, Maxwell, Strauss, Elias, and Peterson, O. L.: Sulfadiazine: Therapeutic Evaluation and Toxic Effects on Four Hundred and Forty-Six Patients. *J. A. M. A.* 116: 2641-2647 (June 14) 1941.

culture may be negative, but culture of the sputum yields a heavy growth of *Staphylococcus aureus*. The largest reported epidemic occurred during the 1918 influenza pandemic, and influenza virus has been isolated from the lungs in 2 fatal cases and presumably from another in recent years.

2. Five cases of *Staphylococcus aureus* pneumonia were observed during a proved influenza A epidemic, and in the 3 cases in which serum was obtained, neutralization tests in mice proved that influenza A infection had immediately preceded the pneumonia. One of these patients died of overwhelming infection soon after admission; the other 4 were treated with sulfathiazole. One of the sulfathiazole treated patients died on the nineteenth hospital day. The other 3 patients made good recoveries, including 1 patient in whom empyema cleared with aspiration during the course of treatment with sulfathiazole.

4. It is concluded from this that *Staphylococcus aureus* pneumonia often occurs as a complication of influenza, and that sulfathiazole or sulfadiazine is indicated in its treatment.

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ATLAS-AXIS DISLOCATION FOLLOWING CERVICAL INFECTION

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Dislocation of the axis on the atlas is often traumatic (frequently with fracture of the odontoid process and resultant damage to the cord), but it may also occur as a sequel to cervical infections. This second cause brings the patient into the field of the otorhinolaryngologist, who deals with infections in this region and who must recognize the source of the dislocation.

ANATOMY

To understand the mechanics of this dislocation one must know the anatomy of the articulations and ligaments.¹

There are three articulations: the lateral ones are arthrodial diarthroses because of the flattened articulating surfaces; the third, a rotary diarthrosis, median in position, lies between the smooth anterior surface of the odontoid process and the articular facet on the posterior aspect of the anterior arch of the atlas. A synovial membrane lines each of the three joints and, in addition, there is a synovial sac between the odontoid process and the transverse ligament.

The ligaments, of course, maintain the integrity of the joints. Each joint has an articular capsule. The strong point of the lateral articulations is a distinct band, the accessory ligament, situated in the vertebral canal and passing down medially from the lateral mass of the atlas to the posterior aspect of the body of the axis.

Next in importance are (1) the anterior atlo-axoid ligament (old term), which is a membranous structure, thin laterally and strong medially, extending from the anterior body of the atlas to the front of the body of the axis; (2) the posterior atlo-axoid ligament, which extends from the posterior arch of the atlas to the upper

border of the vertebral arch of the axis, and (3) the transverse ligament of the atlas, which is a strong band attached laterally to the tubercles on the median aspects of the lateral masses of the atlas and running posterior to the neck of the odontoid process to hold it in place. There is a thin plate of fibrocartilage in its central portion.

PATHOLOGY

The best explanation of the pathologic changes which occur is that of Grieg,² who showed that cervical infections, by producing hyperemia, cause vertebral decalcification of a greater or less degree. The ligaments are so strong that they cannot be avulsed without tearing off fragments of bone with them, but if the bone has undergone previous decalcification the ligaments yield readily.

Jones³ demonstrated this decalcification in some of his roentgen studies. He showed that it is peculiar to children at an age when the bones are imperfectly developed and not well calcified, that an inflammatory lesion anywhere in the upper cervical region may cause such decalcification, that the anterior arch of the atlas may show decalcification without destruction and, finally, that the onset of dislocation usually occurs about ten days after the infection begins.

Deslosses⁴ and Grisel,⁵ as quoted by Grieg,² believed that nasopharyngitis causes muscle spasm which produces the torticollis and vertebral subluxation. With this Grieg² disagreed, asserting that the spasm of the prevertebral and occipitovertebral muscles splints the bones and is therefore a result, not a cause.

These authorities then give the following sequence of events: (1) cervical infection with hyperemia, (2) vertebral decalcification and loosening of the ligamentous attachments, (3) slipping forward of one or both lateral articular facets of the atlas and locking as the facet slips forward and downward over the opposing facet of the axis or (4) slipping backward of one articular facet of the atlas (if both lateral facets slip to any degree death may supervene since, to permit this to happen the odontoid must have moved posteriorly and thus have crushed the cord). Berkheiser and Seidler⁶ presented 2 such cases in a series of 5. But they overlooked the fact that in any three-point suspension two points must always move, otherwise a fracture occurs.

CLINICAL FINDINGS AND RELATION TO SURGERY

The patient holds his head rigidly, slightly in front of the normal plane, tilted toward one shoulder, with the face rotated toward the opposite shoulder. Tenderness over the lateral masses of the axis and atlas occurred in all 4 of our cases. There is no spasm of the sternomastoid muscle such as occurs in "spastic" torticollis, the rigidity resulting from spasm of the deep cervical muscles.

One may see an occasional case of torticollis preceding or following mastoidectomy and must be alert not to attribute it to an unconscious attempt on the part of the patient to relax an inflamed sternomastoid muscle on the diseased or operated side. Two of our patients whose dislocation was associated with mastoiditis, one occurring before operation and the other after opera-

From the Department of Surgery, division of otorhinolaryngology, University of California Medical School, and Department of Otolaryngology, Children's Hospital.
1. Cunningham, D. J.: Text-Book of Anatomy, edited by A. Robinson, ed. 6, New York, William Wood & Company, 1931, p. 311.

Grieg, D. M.: The Surgical Pathology of Bone, London, O'ner & Boyd, 1931, p. 227.

3. Jones, R. W.: Dislocation of the Neck at the Atlanto-Axial Joint. Proc. Roy. Soc. Med. 25: 586-590 (Feb.) 1932.

4. Deslosses, P.: Un cas de maladie de Grisel. Torticollis pharyngien par luxation de l'atlas. Presse med. 38: 1179 (Aug. 30) 1925.

5. Grisel, P.: Enucleation de l'atlas et torticollis nageant. Presse med. 38: 50 (Jan. 11) 1930.

6. Berkheiser, E. J., and Seidler, L. Ferdinand: Neurologic Dislocations of Atlanto-Axial Joint. J. A. M. A. 66: 517 (Feb. 14) 1931.

tion, held the head tilted toward the sound side and the chin toward the diseased side. This position actually increased the strain on the inflamed muscle and caused me to consider the possibility that a cervical dislocation had in fact occurred.

It should be emphasized that care must be exercised in placing a patient for operation and in moving him postoperatively, particularly after severe or long-lasting cervical infections. In 1 case in our series (case 4) in which the dislocation was found after operation the position on the table may have been partly responsible for the dislocation by stretching of the ligamentous attachments, though the dislocation did not occur until twenty-four hours after the operation.

Two cases occurring after tonsillectomy have been reported. One following local anesthesia was reported by Swanberg.⁷ This developed on the evening of the day of operation. There was no history of violence.

Jones⁸ reported a case gradual in onset two weeks after an adenotonsillectomy. It was probably a result of inflamed and hyperemic nasopharynx and pharynx.

The tilted, rotated and fixed head may give rise to the suspicion that a retropharyngeal abscess exists, as indeed it may, though not necessarily; in case 2 such a diagnosis was erroneously made. In making the differential diagnosis in such cases local examination will establish the presence of retropharyngeal abscess and roentgen studies will show the cervical dislocation.

No neurologic signs or symptoms were present in any of the 4 cases, so there was no compression of the cord.

TREATMENT

Reduction of the dislocation is accomplished by accentuating the deformity, in addition to traction, permitting unlocking of the lips of the lateral articular facets. Reposition of the vertebrae is secured by extension and by bringing the head to the midline while rotating the chin to its normal position. Fixation in plaster for a variable time allows healing and reattachment of the ligaments. In 1 case a paper collar support was used after removal of the plaster.

The results in all cases were good.

A series of 4 cases is presented briefly, each case having features which makes separate presentation desirable.

CASE 1.—*Retropharyngeal abscess with atlo-axoid dislocation.*

E. R., a boy aged 7 years, had had pain and swelling of the left side of the neck for six weeks, with a temperature ranging from normal to 103 F. He held his head flexed to the left with the chin rotated toward the left shoulder. Extension of the neck was greatly limited but forward flexion was normal. Rotation of the chin to the left was 75 per cent of normal but to the right only 10 per cent of normal. Contracture of the sternomastoid muscle was not present. Slight tenderness was found over the upper cervical vertebrae. There was a protrusion of the left pharynx posteriorly into the throat. This protrusion was opened and drained, but the asymmetry persisted.

Roentgenograms showed a forward dislocation of the atlas on the axis on the right, with forward dislocation of the atlas.

A cure was obtained by reposition of the vertebrae and traction.

CASE 2.—*Atlo-axoid dislocation with a diagnosis of retropharyngeal abscess which, however, was not present.*

P. L., a girl aged 14 years, had had severe nasopharyngitis for six weeks and for three weeks a stiff neck with enlarged cervical glands and temperature up to 101 F. Ice packs had

reduced the adenitis but the stiff neck persisted, and she was referred with a diagnosis of "cervical abscess." Examination showed no abscess. The head was tilted toward the right with the chin to the left.

Roentgen examination showed the atlas dislocated forward on the left. The curvature of the cervical spine was obliterated. Reduction of the dislocation and traction effected a cure.

CASE 3.—*Cervical adenitis, mastoiditis, atlo-axoid dislocation, mastoidectomy.*

W. R., a boy aged 6 years, had had a nasopharyngitis, cervical adenitis and right otitis media for twenty-eight days. A "wry neck" with head tipped to the left and chin to the right developed twenty-four hours after tenderness over the mastoid region was noted on the right side.

Roentgen examinations showed anterior dislocation of the right articulation of the atlas on the axis.

Mastoidectomy, reduction of the dislocation and traction resulted in cure.

CASE 4.—*Nasopharyngitis, left otitis media, left mastoiditis, mastoidectomy, followed by atlo-axoid dislocation.*

W. McC., aged 6 years, had been ill since Dec. 19, 1939 with nasopharyngitis and otitis media. On Jan. 6, 1940 a left mastoidectomy was done and twenty-four hours later the child had a "wry neck," holding the head toward the right with the chin to the left.

Roentgenograms showed a forward dislocation of the atlas on the axis at the left articulation.

Reduction of the dislocation and traction effected a cure.

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ROENTGEN THERAPY IN HEREDITARY DIFFUSE POLYPOSIS OF THE COLON

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Diffuse polyposis of the colon of the hereditary type is a distinct disease entity to be clearly differentiated from the postinflammatory type of polyposis, which it resembles in some respects. It is characterized by the presence of multiple, sessile or pedunculated polyps occurring throughout the large bowel and in extreme cases so numerous as almost to replace the normal mucosa. Microscopically the polyps show an adenomatous structure associated with hyperplasia of the lymph follicles and infiltration of the tumor and surrounding tissues with lymphocytes and plasma cells. Ultimately malignant degeneration almost invariably occurs in one or more polyps.

It is not a common disease, for only approximately 200 cases were to be found in the literature in 1938. Its hereditary character has been recognized only during the last twenty years. By carefully questioning one can usually uncover, in members of the family of affected persons, the presence either of the disease or of a suggestive history, such as chronic diarrhea or deaths from cancer of the colon at an early age. The abnormality appears to originate in a gene mutation and is transmitted as a mendelian dominant, but, as Lockhart-Mummery¹ states, the disease is not hereditary in the usual sense of the word. Rather, there is "an inherited instability of the epithelial cells of the large bowel which renders their nuclei peculiarly liable to undergo mutations for excessive rate of growth."

Bargen² describes the evolution of the disease in the following steps: First there is an underlying and

7. Swanberg, Harold: Anterior Dislocation of Axis Following Tonsillectomy, J. A. M. A. 72: 107-108 (Jan. 11) 1919.

8. Jones, A. R.: Dislocation of Neck at Atlanto-Axis Joint, Proc. Roy. Soc. Med. 26: 136 (Dec.) 1932.

1. Lockhart-Mummery, J. P., and Duke, C. E.: Familial Adenomatosis of the Colon and Rectum: Its Relation to Cancer, Lancet 2: 586-589 (Sept. 9) 1939.

2. Bargen, J. Arnold: Causes of Colonic Cancer: Clinical Support of Current Hypotheses, South. M. J. 32: 627-632 (June) 1939.

basic susceptibility. Then there occurs hyperplasia of lymph follicles followed by hyperplasia of the overlying mucosa, which forms a protrusion into the bowel lumen. Next adenomatous development occurs in these mucosal excrescences. Later, as the excessive rate of growth continues, it becomes more and more unrestrained until frank carcinomatous changes appear.

The onset of symptoms may be noted in infancy but characteristically occurs at about 20 years of age. There is hypermotility of the bowel and diarrhea with an excess of mucus in the stools, which not infrequently contain blood from ulceration of the surface of the growths. Colicky pain may arise as the result of partial obstruction by the masses of polyps. The effect on general health depends on the amount of blood lost and on the severity of diarrhea and consequent malnu-

medical treatment and of these 56.5 per cent had died of the disease at the time the cases were reported. The surgically treated patients fared badly too, for of the 51 patients who were operated on 35.1 per cent died prior to reporting.

In spite of this poor showing, surgical cures are possible in some cases and it is generally held that radical surgical eradication of all lesions offers the only hope of cure. Just how tenuous that hope is cannot be definitely determined until more complete surveys are made available and actual postoperative mortalities are known.

The simplest surgical measure employed is fulguration. It is a safe and effective treatment but is applicable only to rectal and sigmoid lesions. Many cases are treated successfully and without undue risk by segmental resection if the lesions are conveniently circumscribed.

A more serious problem is presented by those extensive cases in which removal of the entire colon is necessary. Colectomy is a formidable operation, usually requiring to be done in multiple stages over a considerable period of time from six months to one or more years. The mortality mounts with each successive stage even under ideal conditions and in the hands of the most skilled surgeons. The financial burden for hospital bills, surgeons' fees and loss of time from work makes it prohibitive for all but a few. Even if the patient manages to survive the physical and financial hazards, and metastases have not occurred, he is left with a mutilated body, requiring forever special attention to nutritional and excretory functions.

In spite of the risks, total colectomy is frequently advised not only in severe, advanced cases but as a prophylactic measure in the earliest recognizable stage of the disease. This practice seems to me indefensibly radical, especially since the possibilities of more conservative measures have not been explored fully.

There are ample theoretical grounds to justify the hope and expectation that roentgen therapy may prove to be valuable in every phase of the disease. As is well known, hyperplasia of lymphatic tissues and lymphatic infiltrations are peculiarly susceptible to irradiation. Both these conditions are characteristic features of this disease. If it is true, as Bargen believes, that lymph follicle hyperplasia is the initial step in the formation of polyps, it should be possible for the disease to be permanently arrested if the patients are treated at this early stage. As was demonstrated by McKenney, many such preclinical cases could be uncovered by careful investigation of relatives in known cases.

Even after the lesions have advanced to the stage of mucosal hyperplasia and adenoma formation, the tissues are still radiosensitive because of their accelerated rate of growth and tendency to dedifferentiation. Following irradiation the tumors not only should cease to grow but should actually regress. With adequate dosage and repeated application it should be possible to prevent or at least delay the appearance of malignant change. Even after carcinomatous transformation has occurred, worth while temporary palliation and prolongation of life may be expected.

These theoretical possibilities of benefit are strong arguments for evaluating the results of roentgen therapy. Additional advantages are absence of mortality, low cost, slight disability and negligible loss of time from work.



Fig 1 (case 1)—Appearance of colon before treatment, showing great number of polyps throughout

trition. As soon as malignant changes make their appearance there is rapid deterioration of health with characteristic cachexia.

Because of the mildness of the early symptoms the patient is not likely to present himself for examination and treatment until a number of years have passed. According to Bargen, some of the polyps have already undergone malignant changes at the time of the first consultation in a large percentage of cases. Even when the cases are seen early there is the probability that these changes will soon supervene.

In this situation, medical measures offer little of curative value, important though they may be in relieving diarrhea, improving nutrition, combating anemia and eradicating associated infections of the bowel. In a survey of 127 published reports culled from the literature, Hullsiek³ found that 76 patients had received only

3. Hullsiek, Harold E.: Multiple Polyposis of the Colon, Surg., Gynec & Obst., 47: 346-356 (Sept.) 1928

There are a few encouraging and several inconclusive but interesting reports in the literature. In 1930 Barker⁴ reported highly favorable response from high voltage roentgen therapy in an advanced case of polyposis. There was general improvement to a substantial degree, the diarrhea ceased and many of the adenomas disappeared.

Lockhart-Mummery⁵ was not so pleased with his results in 1 case. Although there was temporary improvement and diminution in the size and number of polyps, he did not feel that the amount of benefit offset the severe radiation sickness.

Hullsiek³ used roentgen treatment without any improvement. He does not state what dosage was used, but it is an interesting and pertinent commentary that the patient survived the roentgen treatment to die a few weeks later after total colectomy.

Anderson and his co-workers⁶ reported no improvement in a case of postinflammatory polyposis which followed an amebic infection. Since they gave only 1,100 roentgens and observed the patient only three weeks, their experience can be discarded as inconclusive.

On the other hand, McKenney⁷ questioned several roentgenologists, all of whom endorsed the use of x-rays on the basis of their unpublished experiences. He thereupon treated a series of 10 patients. Of this number 3 were already moribund. Although follow-up studies were not complete in the remaining 7, and he did not enumerate the details of treatment, he summarized his results by stating that the patients were improved symptomatically and that the polyps disappeared or were reduced in number. He abstained from making any claims of cure or recommendations for further use of this form of therapy until it had been more thoroughly evaluated.

In a subsequent paper he⁸ reported the outcome with one of these patients, a boy of 11 years, who received 300 roentgens in 1932 without noticeable effect. Two years later a tumor removed from the rectum for biopsy showed "adenomatous proliferation well on the way to being malignant." After four treatments of 600 roentgens each, his condition improved. Two years later he became ill, had an abdominal fistula, and died shortly thereafter. Postmortem examination disclosed numerous malignant adenomas and a necrosing carcinoma of the rectum with abscess and fistula. Obviously the 300 roentgens given in 1932 was inadequate to control the growth of the adenomas, and subsequent dosage was insufficient to arrest for long the malignant change already apparent at the time of the second course of treatments.

In 2 cases reported here, treatment consisted of high voltage roentgen radiation solely on the basis of theoretical reasoning and without my being aware of the prior experiences cited. In both cases economic considerations made surgical treatment impossible.

REPORT OF CASES

The 2 patients were brothers. Complete investigation of the family history was not possible, but it was learned that one sister had had a resection of the sigmoid because of polyposis and that their mother, her two sisters and one brother had all died of bowel trouble.

CASE 1.—A laborer aged 45 for several years had had increasing bowel symptoms consisting of frequent loose stools containing mucus and blood, flatulence, loss of weight and strength. On proctoscopic examination many polyps were seen over all the surface visualized. The microscopic study of an excised polyp disclosed it to be an adenoma with large round cell infiltration. X-ray examination by the double contrast technic revealed widespread polyposis involving the entire colon (fig. 1).



Fig. 2 (case 1).—Appearance of colon three years after roentgen treatment. Note that polyps are present only in the sigmoid.

Roentgen treatment was begun in April 1935. During the next ten weeks a total of 4,000 roentgens in fractional doses was given over each segment of the abdomen. The reaction to treatment was severe, but after it subsided there was rapid symptomatic improvement. The appetite was good, stools decreased to one or two daily, weight increased, strength became normal and the patient returned to work. He continued to feel perfectly well until April 1938, three years later, when diarrhea reappeared.

Reexamination showed almost complete disappearance of the polyps except in the sigmoid, where they were reduced in size and number (fig. 2). Treatment was repeated, 3,500 roentgens being administered over the sigmoid and 2,500 roentgens over the remainder of the colon. A moderate reaction was followed by another period of good health which lasted until February 1940. At that time diarrhea began again and the course was rapidly downhill. He did not return for treatment, and it was learned later that he had died in June 1940, more than five years after the original treatment.

4. Barker, L. F.: Polyposis of the Colon: Discussion of the Heredofamilial Occurrence of the Disease and of the Extraordinarily Favorable Effects Obtained in One Case by Deep X-Ray Therapy, *M. Clin. North America* 14: 77-86 (July) 1930.

5. Lockhart-Mummery, J. P.: The Causation and Treatment of Multiple Adenomatosis of the Colon, *Ann. Surg.* 99: 178-184 (Jan.) 1934.

6. Anderson, Hamilton H.; Delprat, Daniel; Weeks, Manson, and Reed, Alfred C.: Amebiasis and Pseudopolyposis of the Colon, *J. A. M. A.* 107: 2121-2123 (Dec. 26) 1936.

7. McKenney, Descom C.: Multiple Polyposis of Colon: Familial Factor and Malignant Tendency, *J. A. M. A.* 107: 1871-1876 (Sept. 9) 1939.

8. McKenney, Descom C.: Multiple Polyposis of Colon: Congenital, Heredofamilial, Malignant, *Am. J. Surg.* 46: 204-216 (Oct.) 1939.

This seriously ill man, almost certainly approaching a fatal termination, was restored to perfect health for almost five years. He died after a short illness, probably from carcinoma of the bowel. Although most of the polyps disappeared after the first treatment, the disease

with an associated amebiasis. Since postmortem studies were not carried out, it is not possible to confirm the opinion held by the attending physician that death was due to amebic dysentery. Undoubtedly the presence of the polyps contributed to the intractability of the amebiasis.

I had felt particularly optimistic in beginning treatment of this patient because of the immediate ideal response. One can only conjecture the ultimate results had the complicating infection not been present. Under the circumstances one can only say that following high voltage roentgen therapy the patient was restored to apparently normal health for one year, that his condition during the succeeding year was better than it had been for many years before the treatments were given, and that the polyps decreased in number and size.

CONCLUSIONS

From the references in the literature, from theoretical considerations and from my own limited experiences it would appear that roentgen therapy is a logical and effective adjunct in the treatment of multiple polyposis. Whether "cure" can be obtained by this means remains for the future to determine, but symptomatic relief and a diminution in the size and the number of polyps may reasonably be expected.



Fig. 3 (case 2)—Appearance of colon before treatment, showing amebic ulcerations and scarring, and multiple polyps

was not considered cured and it was planned to repeat the treatments at regular intervals. Had it been possible to do so it would have been possible to judge better the true potentiality for good of this therapy.

CASE 2.—A clerical worker, aged 33 years, after many years of intermittent diarrhea had had a diagnosis of chronic amebiasis, but specific treatment had not relieved him. At the time he presented himself for treatment he was seriously ill, completely incapacitated for work and all but bedridden. The stools were found to be teeming with amebas. Double contrast x-ray examination showed a thick walled, inflamed colon with multiple ulcerations and multiple polyps throughout (fig. 3). Roentgen treatments were given over a five month period beginning in February 1937, each area of the abdomen receiving 4,000 roentgens. There was practically no systemic reaction, and improvement began immediately.

After one year of good health he suffered a recurrence of the amebic dysentery. In May 1938 a second series of roentgen treatments was given, 2,500 roentgens to each segment. Although the amebic infection defied all efforts at eradication by specific medication, the general health improved for a time. Examination made six months later showed a diminution in the number of polyps, but the ulceration and scarring remained as before (fig. 4). Death occurred twenty-seven months after the initial treatment and was reported to have been due to amebic dysentery.

The diagnosis in this case was not conclusively established, but in view of the family history it was considered to be a case of the familial type of diffuse polyposis

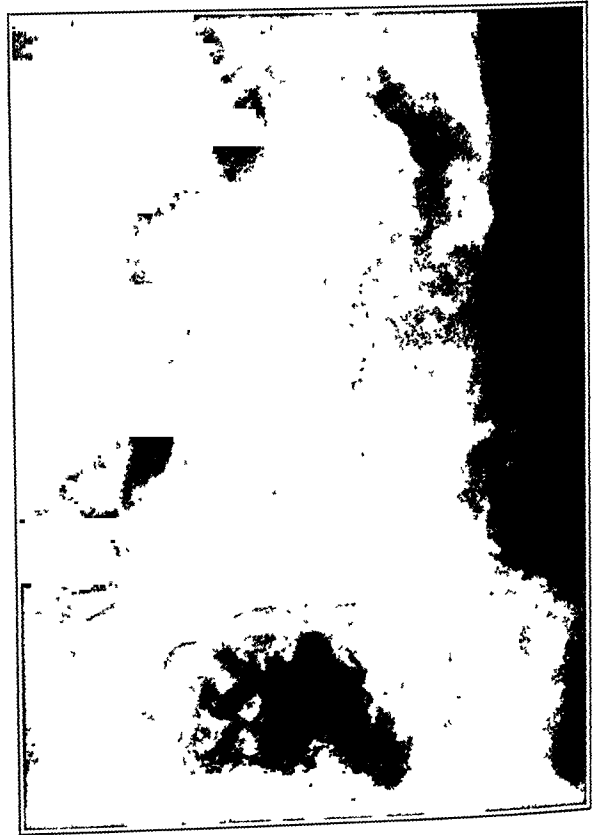


Fig. 4 (case 2)—Appearance of colon eighteen months after first series of roentgen treatments and six months after second series. Note that scarring and amebic ulcerations persist unchanged but that most of the polyps have disappeared

Further studies should be undertaken whenever and wherever suitable cases are encountered and a report of all results should be published, whether favorable or adverse, in order that correct evaluation may eventually be possible.

THE DEVELOPMENT OF CANCER IN
ACRODERMATITIS CHRONICA
ATROPHICANS

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It has often been said that cancer never develops spontaneously in an otherwise healthy, normal skin. The onset of cancer of the skin is usually preceded by certain changes which could be called precancerous.



Fig. 1 (case 1).—Bilateral axillary acrodermatitis. Note atrophy, anoderma and pigmentary changes. On the left side a large papillary ulcerating cancer has developed.

The process is initiated by two factors at work: one an intrinsic change in the structure and functioning of the skin whereby it loses in some degree its protective capacity against injuries and the other an extrinsic factor such as mechanical trauma or chemical irritation. In experimental animals the extrinsic factor in the form of certain very potent carcinogenic hydrocarbons has proved sufficient in itself to cause the development of cancer in an apparently normal skin following a single application of the agent. Again, the ingestion of arsenic in therapeutic quantities over sufficient time may bring about the previously mentioned intrinsic changes of the skin with resultant hyperkeratinization and often multiple epitheliomas. Nevertheless, if we exclude the more highly organized neoplasms such as sweat gland cancers, adenoid cystic epitheliomas and hair matrix carcinomas, it is our contention that the majority of cancers, both squamous cell and basal cell, of the skin and stratified mucous membranes are really scar cancers.

The scars on which cancers of the larynx, buccal mucosa, lip, penis and cervix originate may have been so small as to pass previously unnoticed or to be obscured by the later more obvious cancer, but they have been present. The squamous carcinomas developing in lupus and chronic radiation dermatitis are essentially scar cancers. The genesis of this cancer may be most easily observed in all formative stages in burn scars; the process is fundamentally no different from that which occurs in a lacerated cervix, but the wide expanse or surface of the scar increases the

predisposition to neoplastic changes and renders the transformation almost grossly visible. The loss of such epidermal accessories as hair follicles, sweat glands and oil glands and the inelasticity of the burn scar over joints makes the epithelial covering of the scar especially vulnerable to minute repeated and chronic injuries. Any disease of the skin which causes similar structural changes and loss of the protective function will inevitably result in the development of cancer. Even senility itself with its consequent dermal atrophy is such a state; we¹ have previously shown in a study of age incidence of epitheliomas of the skin that every person will have such a cancer if he lives long enough. It has not been generally appreciated that acrodermatitis chronica atrophicans is such a precancerous disease.

HISTORY OF ACRODERMATITIS

The first known case report of this disease was published in 1883 by Buckwald,² who described involvement of the lower extremities in a man aged 36. Touton³ in 1886 reported a second case with the disease



Fig. 2 (case 1).—Section of cancer developing on basis of acrodermatitis atrophicans. The spindle cell metaplasia is characteristic of epidermoid carcinoma developing in this type of skin.

affecting both arms and legs. Herxheimer and Hartmann⁴ first employed the descriptive term *acrodermatitis chronica atrophicans* in 1902 to qualify this

1. Pack, G. T., and Wuester, W. O.: The Treatment of Malignant Tumors of the Skin, *South. Surgeon* 9:775-796 (Nov.) 1940. Treves, N. E., and Pack, G. T.: *The Skin*, Burn Scars, Surg., Gynec. & Obst. 51:

2. Buckwald, A.: Ein . . . angeborener Hautatrophie, *Vrthjchr. f. I* . . . 10 . . .

3. Touton, K.: Ein Fall von erworbener, idiopathischer Atrophie der Haut, *Deutsche med. Wchnschr.* 12: 68, 1886.

4. Herxheimer, K., and Hartmann, K.: Ueber *Acrodermatitis chronica atrophicans*, *Arch. f. Dermat. u. Syph.* 61: 57, 155, 1902.

subgroup of skin atrophies. A close variant is Pick's erythromélie, which is characterized by atrophic areas on the dorsum of sun exposed hands of elderly persons. The anetodermis erythematodes of Jadassohn or atrophia cutis idiopathica maculosa is a type of acrodermatitis in which the patches are small, round

with hyperthyroidism who also had acrodermatitis involving the feet, arms and face and who was cured of the acrodermatitis by thyroidectomy. In this particular instance they assume that the thyrotoxicosis may have been the exciting factor.

REGIONAL DISTRIBUTION

Acrodermatitis chronica atrophicans has a predilection for the extensor surfaces of the extremities, especially over the joints, although it may occur in almost any region. In 1 of our patients the disease was present on the anterior and medial aspects of the upper arm, shoulders and axillae. In another patient the disease extended over the entire lower legs upward on the posterior surface of the thighs and buttocks. In a third patient the hands, thighs and skin of the abdomen were involved.

STAGES OF THE DISEASE

There are three stages of the disease which merge imperceptibly. The initial stage or phase creates an inflammatory appearance and is characterized by redness, swelling due to edema, scaling, the appearance of a serous discharge and occasionally a lymphangitis. Under the microscope the epithelium is seen to undergo only slight changes such as parakeratosis. There is a perivascular infiltration of plasma cells and lymphocytes. The sweat and sebaceous glands and the dermal papillae

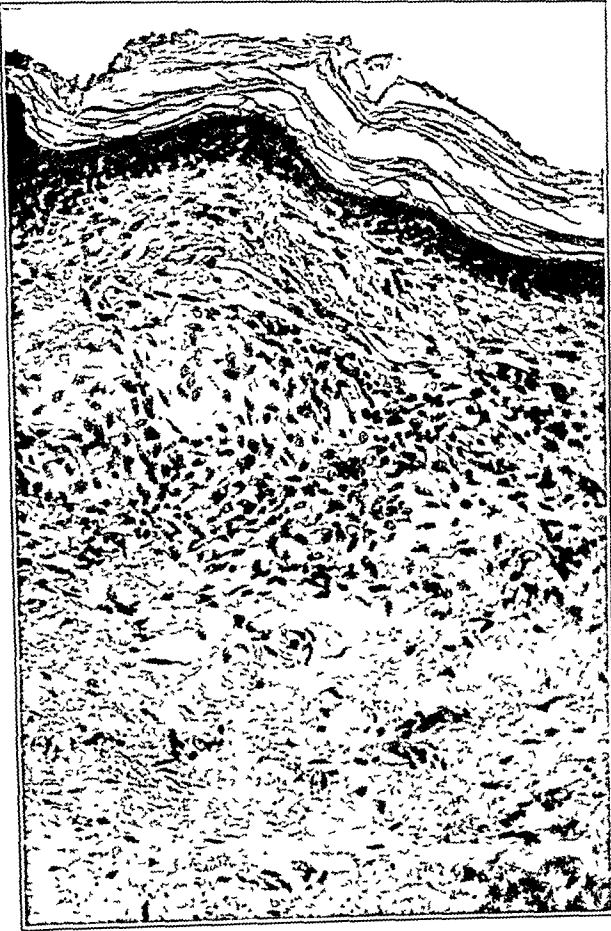


Fig. 3 (case 1).—Section of acrodermatitic skin during second stage. The rete cones and papillae are no longer present. The hair follicles, sweat glands and sebaceous glands are so sparse that none are seen in this section. The derma contains thick collagenous tissue.

or linear. The microscopic appearance is the same as in acrodermatitis except that the changes appear first in the blood vessels. The majority of investigators favor the opinion that acrodermatitis chronica atrophicans is not a true scleroderma.

ETIOLOGY OF ACRODERMATITIS

No satisfactory explanation of the genesis of this disease has been given by any of the interested investigators. It tends to occur during middle or later life, in persons with long-standing vasomotor disturbances affecting the hands and feet. In our patients the disease has been so advanced and the atrophic effects so permanent as to render useless any attempts to modify it by surgical methods directed toward the sympathetic nervous system. It has been assumed to be the result of a generalized metabolic disorder, but specific details of this condition have not been given. Sweitzer and Laymon⁵ have observed the coexistence of arthritis deformans and bone atrophy with acrodermatitis chronica atrophicans. Bezecky and Berlin⁶ had 1 patient



Fig. 4 (case 2).—Extent and distribution of acrodermatitis chronica atrophicans on forearm and elbow. Note loss of elasticity.

appear to be normal. The most evident change in the corium is the atrophy or absence of the elastic tissue and the poorly staining qualities and homogeneity of the collagen.

The second or atrophic stage occurs after a variable time. The skin becomes superficially cracked, wrinkled and dry, owing to atrophy of the sweat and sebaceous

5. Sweitzer, S. E., and Laymon, C. W.: Acrodermatitis Chronica Atrophicans. *Arch. Dermat. & Syph.* 31: 196-212 (Feb.) 1935.
6. Bezecky, R., and Berlin, E.: Zur Ätiologie der Acrodermatitis atrophicans Herxheimer, *Klin. Wchnschr.* 12: 276 (Feb. 18) 1933.

glands. The skin has the thinness of wrinkled cigaret paper and when picked up between the fingers it shows a lack of elastic connective tissue by its slow return to its normal position when released (anetodermia). The fine network of blood vessels appears prominent,

because of the translucence of the epidermis. The color of the skin varies from white to violaceous. Although the epithelium is extremely thin, the stratum corneum may be slightly thicker than normal. The papillae and rete cones are absent or are completely flattened out (fig. 6). The hair follicles, sweat glands and oil glands are found to be either atrophic or absent in some sections on microscopic study. What few elastic fibers remain are fragmented and swollen. The collagen tissue is a dense homogeneous mass and all the edema has disappeared.

A third stage may ensue in some patients, consisting

of localized skin elevations, in the form of fibrous nodules, first described by Herxheimer in 1905, or ulnar streaks or bands extending from the olecranon process to the wrist on the medial aspect of the arm. This uncommon process resembles scleroderma and represents only an extension of the second stage, which some investigators do not subdivide.

PRECANCEROUS FEATURES

The gross and microscopic characteristics of this disease reveal the reasons for neoplastic changes. A wide expanse of skin becomes atrophic, thin yet hyperkeratotic in places and lacking in the protection afforded normal skin by oil and sweat glands and the inherent elasticity of this structure. Such skin is constantly injured by the minutest trauma, especially over the joints. The condition approaches that seen in burn scars. The epitheliomas which supervene are usually of the squamous cell type which is characteristic of most scar cancers, but occasionally basal cell cancers appear. Epitheliomas which develop on the basis of x-ray dermatitis are well known to exhibit certain spindle cell metaplasias and this type of cell is sometimes found comprising the cancers which develop in acrodermatic skin (cases 1 and 2, figs. 2 and 8). Stewart has mentioned the profound degeneration of the elastica as a possible factor in this peculiar morphology of the spindle cell x-ray carcinoma; the same influence might conceivably be present in the skin of acrodermatitis,

wherein the loss of the elastic tissue is one of the most distinctive features.

The relative infrequency of this precancerous disease may be estimated from the statement that in a group of more than three thousand epitheliomas of the skin treated at the Memorial Hospital there were only 4 patients in whom acrodermatitis chronica atrophicans could be considered as a determining factor. These case reports are submitted in some detail.

TREATMENT

There is no known curative remedy for acrodermatitis chronica atrophicans. It would seem logical to protect this delicate skin by the use of nonirritating emollients such as toilet hydrous wool fat or cold creams without a mineral base. The treatment of the epitheliomas developing in this skin depends on the location, histologic type of cancer and the condition of the surrounding skin. In our experience we have found that the acrodermatitic skin does not tolerate roentgen or radium dosages to the limits usually necessary to sterilize these cancers unless they are of the more radiosensitive basal cell type. There is a disappointing lack of recuperative power of the skin in this disease, and the resultant ulcerations subsequent to irradiation in neces-

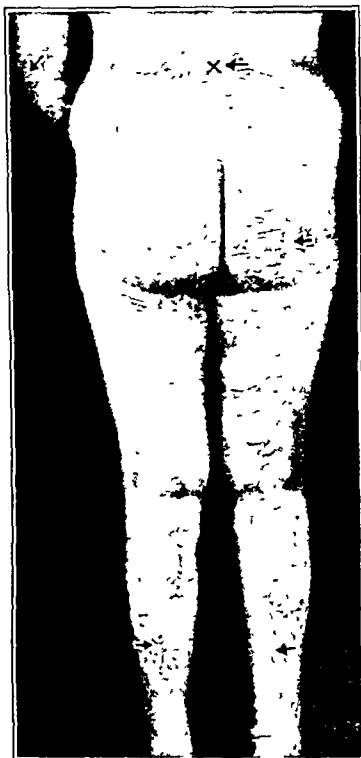


Fig. 5 (case 2).—Extent and distribution of acrodermatitis chronica atrophicans on lower extremities

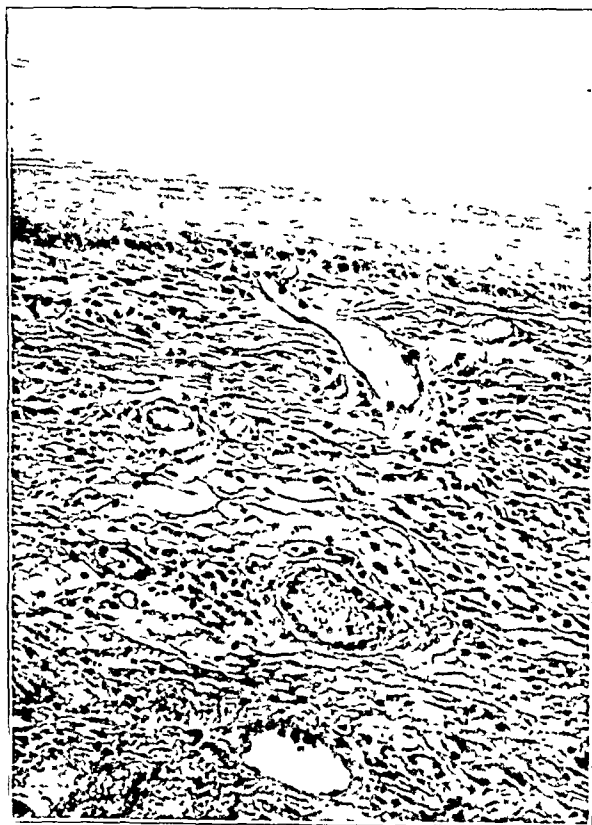


Fig. 6 (case 2).—Section of acrodermatitic skin during late first stage. Parakeratosis of the horny layer. Diffuse infiltration of plasma cells and lymphocytes in the corium. The blood vessels are dilated and considerable edema is present

sary doses offers a serious problem in management. The occasional spindle cell carcinoma is notoriously resistant to all forms of radiation, and local recurrences are common. These cancers in general should be treated just as are burn scar cancers, by radical surgical excision whenever possible and when a curative result is anticipated, by irradiation only, whenever palliation only

is expected. Metastasis from spindle cell carcinoma is by way of the lymphatics to regional lymph nodes, not generally by the blood vascular route as in the case of sarcomas. After an analysis of some two hundred epitheliomas of the skin of the extremities treated at

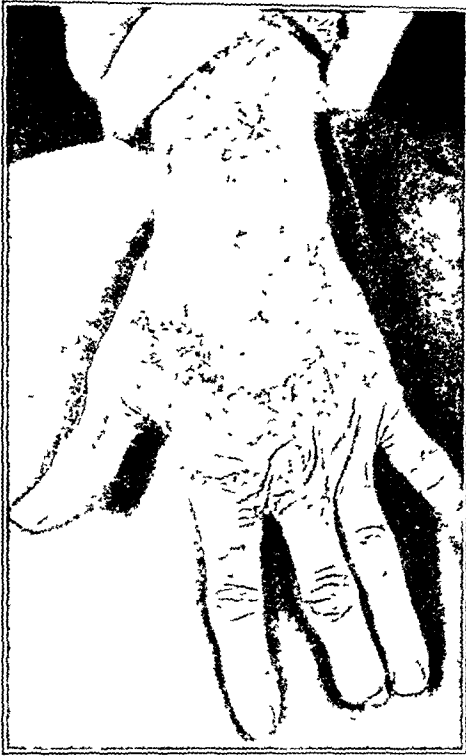


Fig 7 (case 3).—Acrodermatitic skin of dorsum of hand after complete regression of carcinoma following radium treatment.

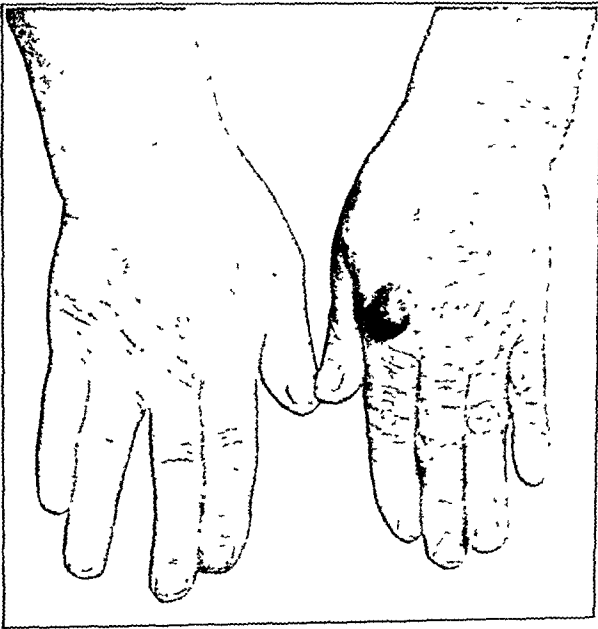


Fig 8 (case 2)—Acrodermatitis chronica atrophicans of left hand. Epidermoid carcinoma developing over second metacarpophalangeal joint. Note the shining, translucent, inelastic skin.

the Memorial Hospital, the inevitable conclusion was reached that surgical excision is the only possible method of obtaining cures when metastatic cancer involves lymph nodes.

REPORT OF CASES

CASE 1.—W. L., a man aged 60, American, a paperhanger, complained of an "ulcer" of the left upper arm of nine months' duration. For the previous six years he had been aware of atrophic changes occurring bilaterally in the skin of the axillas and medial aspect of the upper arms. When the ulcer appeared on the left arm it was untreated for three months and then a physician applied ointments for two months until large lymph nodes became palpable. He was transferred to a roentgenologist, who administered eighteen roentgen treatments with consequent slight improvement.

On July 30, 1936 the patient applied to the Memorial Hospital. The skin of each axilla and medial aspect of each upper arm was thin, transparent, hairless and atrophic. There was a complete loss of dermal elasticity. An ulcer measuring 8 by 8 by 2 cm. occupied the medial and anterior surfaces of the left upper arm. The base of the ulcer was necrotic and the edges were elevated and inflamed. There was a draining sinus high in the left axilla. The clinical diagnosis was epider-

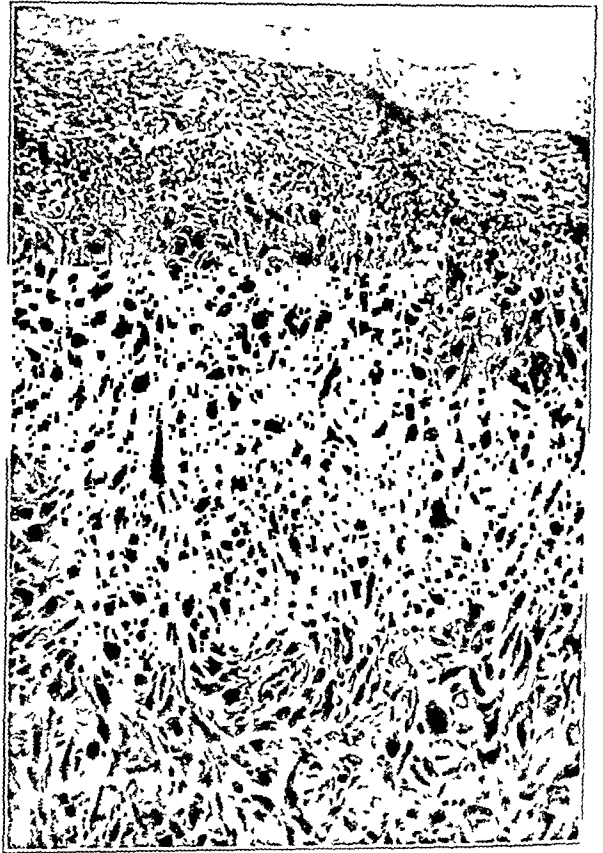


Fig 9 (case 2)—Section of spindle cell epidermoid carcinoma developing on basis of acrodermatitis atrophicans.

moid carcinoma of acrodermatitic skin with metastases to axillary and supraclavicular lymph nodes. A biopsy from the ulcer margin was reported as epidermoid carcinoma with spindle cell metaplasia. Aspiration biopsy of a left supraclavicular node was positive for carcinoma. A section of the atrophic skin was typical of acrodermatitis chronica atrophicans (fig 3).

The tumor was technically inoperable because the axillary nodes were large, confluent and continuous with the supraclavicular nodes. The cancer had perforated the capsules of the nodes to infiltrate diffusely throughout the pectoral region. Even an interscapulothoracic amputation would not have been successful. A roentgenogram of the chest revealed no evidence of pulmonary metastasis. Therefore radiation therapy was given. The primary cancer was treated by the 4 Gm radium element pack with the following factors: 10 cm radium-skin distance, filter 1 mm of platinum, total dose of 40,000 rpy.

hours. The shoulder girdle received roentgen therapy through four ports: left supraclavicular, left axilla direct, left axilla anterior, left axilla posterior. The factors were 200 kilovolts, 70 cm. target-skin distance, 250 roentgens, two ports daily for a total dose of 1,750 roentgens \times 4. Palliative good results were obtained but the patient died on Feb. 7, 1937 as the result of extension of the disease.

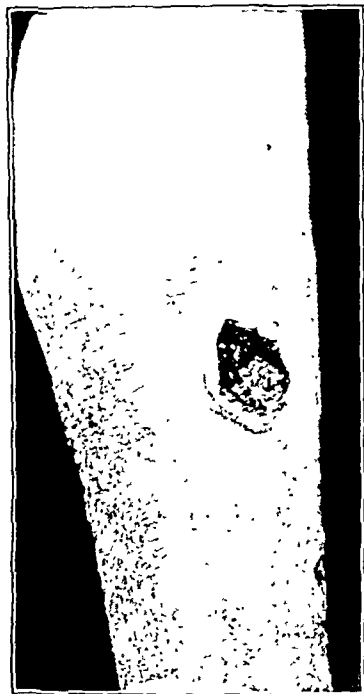


Fig. 10 (case 4).—Epithelioma developing on skin of tibial region.

evidence of acrodermatitis in the skin of the upper extremities, lower extremities and buttocks (figs. 4 and 5). On the dorsum of the left hand overlying the distal end of the second metacarpal bone was an elevated, papillary, red, painful tumor, measuring 2.5 by 3 cm. (fig. 8). The skin on the dorsum of the hand and extending upward to 5 cm. above the elbow was atrophic, inelastic, glistening and fissured. The epitrochlear and axillary lymph nodes were not palpably enlarged. An ulcer 1 cm. in diameter was situated on the right ankle, and another ulcer 2 by 3 cm. in size was located on the left ankle. There was moderate edema of both ankles. The reddish blue atrophic dermatitis extended above the level of the lumbosacral region. The clinical diagnosis was multiple epidermoid carcinoma developing on the basis of acrodermatitis. The diagnoses were confirmed by biopsies of the ulcerated lesions and of the atrophic skin. The carcinoma showed spindle cell metaplasia (figs. 6 and 9).

Surgical excision and skin grafting were advised and refused. The three epitheliomas were then treated by fractionated doses of intermediate voltage roentgen rays with the following factors: 140 kilovolts, 30 cm. target-skin distance, 3 mm. of aluminum filter, 200 roentgens daily until 2,400 roentgens was administered to each of the three lesions. The patient then disappeared from observation for six months, by which time the epitheliomas of the ankles were healed but the one on the hand had grown progressively. The entire hand was now swollen and edematous, surrounding a deep, adherent painful ulcer. One left axillary node was enlarged and firm.

The index and midfingers of the left hand were amputated high through the corresponding metacarpal bones, and the left axilla was dissected on Oct. 9, 1936. The microscopic diagnosis was spindle cell carcinoma metastatic to lymph nodes. Within two weeks, several nodules appeared in the skin of the forearm. On this account the left arm was disarticulated at the shoulder on Nov. 6, 1936. The epitrochlear lymph nodes,

the nodules in the skin and certain nodes lying near the median nerve in the upper arm contained metastatic spindle cell carcinoma. Within four months the patient died of pulmonary metastasis.

CASE 3.—M. G., a Portuguese woman aged 65, applied to the Memorial Hospital on Oct. 19, 1931 complaining of an ulcer on the left arm of six months' duration. On the dorsum of the left forearm just above the wrist was a papillomatous, indurated, ulcerated nontender lesion measuring 2 by 3.5 cm. There was marked atrophy, scarring, fissuring and the formation of hyperkeratoses involving the skin on the dorsum of the left hand and wrist. The clinical diagnosis was epidermoid carcinoma developing on the basis of acrodermatitis chronica atrophicans (fig. 7).

On Dec. 17, 1931 the carcinoma was removed with the actual cautery. The microscopic diagnosis was plexiform epidermoid carcinoma, grade 3. Within the next few months several keratotic lesions on the hand were treated by beta radiation, the unfiltered radon bulb being used for doses of 400 millicurie minutes to each lesion. On Oct. 3, 1932 there was no evidence of recurrence, and the patient returned to her home in the British West Indies.

On May 11, 1936 she returned to the Memorial Hospital with three new neoplasms, all developing on the acrodermatitic skin of her left hand and forearm. Biopsies proved that all were basal cell carcinomas. They were distributed as follows: (1) a lesion measuring 1 cm. in diameter situated on the extensor surface of the left forearm, (2) a lesion measuring 3 cm. situated on the dorsum of the left hand between the



Fig. 11 (case 4).—Appearance after excision and skin grafting.

thumb and the index finger and (3) a lesion measuring 3 cm on the dorsal aspect of the thenar eminence. All three basal cell carcinomas were successfully treated by the application of square and rectangular radon plaques applied at distances of 1 cm., with filters equivalent to 3 mm. of brass and doses between 800 and 1,400 millicurie hours. The last communication from the patient stated that she was well and that there was no evidence of recurrence.

CASE 4.—C. C., an Irish woman aged 60, had had great varicosities of both legs for ten years. Three years before admission to the Memorial Hospital she noticed a pigmented, elevated lesion on the anteromedial aspect of the left lower leg. She treated it unsuccessfully by the application of boric acid ointment.

Physical examination revealed an ulcer 3 by 3 cm. situated 18 cm. above the left internal malleolus. The base of the ulcer was clean and the edges were indurated. There were no palpable inguinal lymph nodes. The skin of the left leg and the lower half of the right leg was dry, thin, translucent and atrophic. The clinical diagnosis was epidermoid carcinoma developing on the basis of acrodermatitis chronica atrophicans (figs. 10 and 11).

On Jan. 22, 1935 a wide surgical excision of this cancer was done, followed by the application of Reverdin pinch grafts. The microscopic study of the excised specimen was reported as epidermoid carcinoma, grade 2. Although the acrodermatitis has progressively become worse there has been no evidence of recurrence during the six ensuing years. When last examined in February 1941 there was no evidence of cancer.

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ELECTROENCEPHALOGRAPHY

AS A METHOD OF DISTINGUISHING TRUE
FROM FALSE BLINDNESS

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As there has never been a reliable objective test for blindness, a physician suspecting hysterical blindness or malingering may be unable to confirm his diagnosis. Conversely, the physician may feel confident that a patient is not a malingerer and yet be unable to prove genuine blindness. It was just such a situation that led to this study (case 1). The value of a reliable objective test for blindness, especially in compensation cases and in military medicine, is obvious.

Electroencephalography is a method of recording the electrical activity of the brain, roughly analogous to the use of electrocardiography in studying the activity of the heart. The most prominent brain waves are the alpha waves with an approximate rhythm of 8 per second. These waves appear only with the eyes shut, as they arise almost entirely from the visual cortex and are broken up when the eyes are open and the subject looks at an object.

A uniform visual field of light or dark, or even a field containing blurred indefinite outlines, usually does not interrupt the alpha rhythm. It requires a definite visual pattern to break the alpha rhythm. If a blind or partially blind subject attempts to look at an object such as a pencil and the alpha waves persist, one can conclude that there is not enough vision left to distinguish objects or to be of practical value to the patient. On the other hand, if a supposedly blind person is asked to open his eyes and look around and the alpha waves stop, one can conclude that there is enough vision left to distinguish objects at least, and one can with reasonable safety make a diagnosis of malingering (case 2) or hysterical blindness (case 3).

The following cases illustrate the value of electroencephalography as an objective test of blindness when the diagnosis is uncertain:

CASE 1.—A man aged 38, an electrician, seen in consultation with Dr. Russell Horsfield on March 7, 1941, was working on a switch on Dec. 9, 1940, when a screw driver slipped and caused a short circuit on a 440 volt line, resulting in two bright flashes of light. The patient was blinded by the flashes and

has been able only to distinguish large objects indistinctly since the accident. He has been unable to read or work and has claimed compensation. No pathologic changes could be found on examination, except contracted visual fields and the poor vision complained of. The retinas and optic disks appeared normal, and the pupils reacted to light.

There were therefore no definite objective findings to support the contention of blindness. Although this was a compensation case and malingering or hysteria seemed logical, Dr. Horsfield and I both felt that the patient was truly blind. The electroencephalograph showed alpha waves with the eyes open as well as shut and while attempting to look at a pencil (fig. 1). On the basis of this finding we recommended that the patient be compensated for his blindness. It is probable that later on there will be an optic atrophy.

CASE 2.—A man aged 45, a veteran, who had received \$159 a month for claimed complete blindness since being gassed in the last war, kept his eyes tightly shut and wore dark glasses. Repeated examinations had failed to reveal any demonstrable pathologic condition, and the pupils reacted to light. Although malingering was suspected, it could never be proved. Electroencephalography showed cessation of alpha waves when he attempted to look at a pencil (fig. 2). The diagnosis of hysterical blindness or malingering was made, and observation by investigators showed that the patient was gardening and fishing with a facility not usual in one who is completely blind.

CASE 3.—A woman aged 25, with epilepsy and a superimposed neurosis, suffered from astasia abasia and complete blindness shortly after being put on phenytoin sodium and following an argument with her husband. Examination showed absence of pathologic changes, and a diagnosis of hysterical blindness was made. Electroencephalography showed cessation of the alpha rhythm when her eyes were opened (fig. 3), although she claimed she could not see a thing. This confirmed the diagnosis of hysterical blindness, which was again confirmed by the patient immediately recovering her vision under the suggestion that the recording of the brain waves was a treatment.



Fig. 1 (case 1).—Record showing alpha waves with eyes shut and eyes open. These waves are slower than average, a characteristic found in most records from blind people. Diagnosis, true organic blindness.



Fig. 2 (case 2).—Record showing alpha waves with eyes shut but cessation of alpha waves with eyes open. Patient claimed he still could not see with his eyes open, but the alpha waves stopped. Diagnosis malingering.



Fig. 3 (case 3).—Record showing alpha waves with eyes shut but no alpha waves with eyes open. Patient claimed she could not see with her eyes open, but the alpha waves stopped. Diagnosis hysterical blindness.

COMMENT

No further comment is necessary, except that unfortunately a few people do not have an alpha rhythm with the eyes either open or shut. In this case the test cannot be made. It is interesting to speculate on the light this study throws on the nature of hysteria. Whatever the pathologic basis of this disorder, for the first time it can be stated categorically that it is not in the sensory or motor pathways or their primary cortical centers of representation.

SUMMARY AND CONCLUSIONS

1. Electroencephalography is a reliable objective test for true blindness as opposed to malingering or hysterical blindness.

2. The persistence of alpha waves when the subject attempts to look at an object is presumptive evidence of true organic blindness to the degree of his not being able to distinguish objects clearly enough for practical purposes.

3. The cessation of alpha waves when the subject attempts to look at an object but still claims to be unable to see anything is presumptive evidence of malingering or hysterical blindness.

4. Whatever the pathologic basis of hysteria may be, it does not involve the sensory or motor pathways or their primary cortical centers of representation.

706 Medical and Dental Building.

HISTOPLASMA CAPSULATUM AS A CAUSE OF CHRONIC ULCER- ATIVE ENTERITIS

RICHARD G. HENDERSON, M.D.

DETROIT

HENRY PINKERTON, M.D.

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Human infection with *Histoplasma capsulatum* is now a well recognized condition, 30 cases having been reported in detail up to the present time.¹ Incomplete information concerning 11 additional cases, some of which are in the process of publication, has been made available to us.² Darling³ is credited with first describing this organism and reporting 3 cases in 1906, 1908 and 1909. However, Strong⁴ is said to have reported

Read before the St. Louis Pathological Society, Feb. 7, 1941.
From the Department of Pathology, St. Louis University School of Medicine.

1. These reports include:

- Williams, R. H., and Cromartie, W. J.: *Histoplasmosis: Report of a Case*, *Ann. Int. Med.* **13**: 2166-2171 (May) 1940.
Clemens, H. H., and Barnes, M. L.: *Histoplasmosis of Darling*, *South. M. J.* **33**: 11-15 (Jan.) 1940.
Dodd, Katherine, and Tompkins, Edna H.: *A Case of Histoplasmosis of Darling in an Infant*, *Am. J. Trop. Med.* **14**: 127-137 (March) 1934.
Hansmann, G. H., and Schenken, J. R.: *A Unique Infection in Man with a New Yeast-like Organism*, *Am. J. Path.* **9**: 920 (Nov.) 1933; *A Unique Infection in Man Caused by a New Yeast-like Organism: A Pathogenic Member of the Genus Scedonomium*, *ibid.* **10**: 731-738 (Nov.) 1934.
Müller, H.: *Histoplasmosis in East Java*, *Geneesk. tijdschr. v. Nederl.-Indië* **72**: 889-895 (July) 1932.
Negroni, P.: *Estudio micológico del primer caso Sud-Americano de histoplasmosis*, *Proc. Third Internat. Cong. Microbiol.*, New York, 1939, pp. 508-509.
Rhodes, P. H.; Conant, N. F., and Gleason, L. R. B.: *Histoplasmosis: Report of Case in Infant Three Months of Age*, *J. Pediat.* **18**: 235-242 (Feb.) 1941.
Parsons, R. J.: *The Pathology of Histoplasmosis in Man: Five Cases*, read at the meeting of the American Association of Pathologists and Bacteriologists, New York, April 10, 1941.
Riley, W. A., and Watson, C. J.: *Darling's Histoplasmosis in the United States: The Possibility of Further Occurrence of Cases*, *Minnesota Med.* **9**: 97 (Feb.) 1926; *Histoplasmosis of Darling: Case Originating in Minnesota*, *Am. J. Trop. Med.* **6**: 271-282 (July) 1926.
Wade, H. W.: *Report to Culion Medical Society, 1926; cited by Meloney*.⁶
Gunther, W. A., and Lafferty, C. R.: *Histoplasmosis of Darling: Report of a Case*, *J. M. A. Alabama* **9**: 337-339 (April) 1940.
Wright, R. B., and Hachtel, F. W.: *Histoplasmosis of Darling: Report of a Case*, *Ann. Int. Med.* **15**: 309-319 (Aug.) 1941.
Scott, E. P.: *Histoplasmosis*, *J. Pediat.* **19**: 668-671 (Nov.) 1941.
Darling (footnotes 3 and 7). Crumrine and Ke-el.⁵ Agrest and Gray.⁹ Shaffer, Shaul and Mitchell.¹⁰ Brown, Havens and Maxath.¹¹ Anderson, Michelson and Dunn.¹² Phelps and Mallory.¹³ Amolsch and Wax.¹⁴ Humphrey.¹⁵ Strong.⁴ Van Pernis, Benson and Holinger.¹⁶
2 Moore, Morris: Personal communication to the authors. Forry and Culbertson.¹⁷ Allen.¹⁸ Meloney (footnotes 6 and 14).
3 Darling, S. T.: *A Protozoan General Infection Producing Pseudotubercles in the Lungs and Focal Necrosis in the Liver, Spleen and Lymph Nodes*, *J. A. M. A.* **46**: 1283-1285 (April 28) 1906; footnote 7.
4 Strong, R. P.: *A Study of Some Typical Ulcerations of the Skin with Particular Reference to Their Etiology*, *Philippine J. Sc.* **1**: 91-115, 1906; cited by Meloney.⁶

a case in 1906, which is referred to by Meloney. No further instances were reported until 1926, but during the past few years the condition has been reported with greatly increasing frequency. Although originally believed to be a protozoan, recent studies of the organism by DeMonbreun⁵ and others have shown that it is a yeast.

The clinical picture of histoplasmosis is a variable one, being in general that of a chronic, febrile illness affecting all age groups and characterized by loss of weight, weakness, splenomegaly and generalized enlargement of the lymph nodes. The literature has been carefully reviewed in a recent publication by Meloney.⁶

The case to be reported here is of particular interest in that the most prominent clinical feature was severe diarrhea, while the essential pathologic picture was an ulcerative colitis and terminal ileitis. A review of the literature, with particular attention to the occurrence of ulcerative enteritis, shows that such lesions have frequently been present although clinical evidence of enteritis has rarely been described as a conspicuous feature of the disease.

REPORT OF CASE

History.—A white man aged 70, a farmer, entered St. Mary's Hospital, Feb. 16, 1940 complaining of persistent diarrhea, loss of weight and progressive weakness. A severe diarrhea developed during the early fall when he was actively engaged in harvesting corn, five months before admission, and except for a short remission of two weeks continued through the entire course of the illness. Shortly after the symptoms began amebas are said to have been found in the stools, but in spite of treatment the diarrhea continued unabated. After the first few weeks of the illness, weakness and loss of weight were noticed. Up to the time of admission there had been a loss of 30 pounds (13.6 Kg.). The patient passed ten to fifteen liquid or semiliquid stools a day. These were white and contained soft yellow lumps. The movements were never accompanied by pain or cramping, and blood was never noticed in the stools.

The family history was not contributory. The patient had always been well prior to this illness.

Examination.—On physical examination the patient showed advanced emaciation, dehydration and weakness. He was unable to speak above a whisper. The pharynx was injected. The tongue was moist and furred. The heart and lungs were normal. The blood pressure was 80 systolic and 65 diastolic. The abdomen was distended and slightly tender. The liver was palpable five fingerbreadths below the costal margin, the edge being smooth and slightly tender to palpation. The spleen was not palpable.

On the day of admission the temperature was 97 F. and the pulse was 96 a minute. The temperature remained subnormal until the evening before death, at which time it was 102.8 F. The pulse dropped after admission to 60 beats a minute and varied between 60 and 80 a minute thereafter. A catheterized specimen of urine showed 1+ albumin with 12 pus cells per high power field. The total white cell count of the blood was 11,200 cells per cubic millimeter with 2 juveniles, 9 stab cells, 78 segmented forms and 12 lymphocytes. The red blood cell count was 3,850,000 per cubic millimeter. The nonprotein nitrogen was 50 mg. per hundred cubic centimeters and the blood sugar was 115 mg.

Course.—The patient's condition on entry was considered so grave that only supportive treatment was given. A rectal examination was done, however, and the rectal pouch was found dilated, the rectal walls being extremely tender. The day after admission the patient complained of tenderness in the right

5. DeMonbreun, W. A.: *The Cultivation and Cultural Characteristics of Darling's Histoplasma Capsulatum*, *Am. J. Trop. Med.* **14**: 93-125 (March) 1934.

6. Meloney, H. E.: *Histoplasmosis: A Review*, *Am. J. Trop. Med.* **20**: 603-615 (July) 1940.

upper quadrant for the first time. He died quietly on the third day after admission. The clinical diagnosis was ulcerative colitis of undetermined cause. Amebic dysentery and an obscure malignant condition were also considered as diagnostic possibilities.

Necropsy.—Gross Appearance: The extremities showed a great degree of wasting. The chest was emphysematous and the ribs were prominent. The skin over the body was dry and scaly, with many areas of hyperkeratosis about the face. A small amount of straw colored fluid was present in the pleural and pericardial cavities. The peritoneal cavity contained 50 cc. of a seropurulent exudate a large amount of which was in the pelvic portions of the cavity. The peritoneal surfaces were covered with a diffuse fibrinous exudate, the loops of intestine being easily separated. The lower lobe of the left lung showed patchy areas of pneumonic consolidation. The coronary vessels were tortuous and there was some thickening of the cusps of the mitral and aortic valves. The liver was enlarged, the cut surface showing a nutmeg type of mottling. There was thickening of the splenic capsule with a soft, mushy pulp. The terminal ileum, cecum and colon were involved in an ulcerative process. There were approximately thirty ulcers varying from 0.5 to 1.5 cm. in diameter, the long axis lying transversely and the lesions having sharp undermined edges. One ulcer in the terminal ileum had ruptured. Several large firm lymph nodes were present in the mesentery. The kidneys were normal in size and appearance. The adrenals were of the usual size and shape but on cut section several small areas of necrosis were present.

Microscopic Appearance: Sections through the intestinal ulcers showed erosion of the mucosa and submucosa, the muscularis remaining intact except in the perforated lesions. There

inflammatory cells along the base of the mucosa. On the serosal surface there was a layer of fibrin, polymorphonuclear leukocytes and macrophages. The adrenals showed five to six tubercle-like lesions varying greatly in size. One large lesion had a necrotic center with a wall of chronic inflammatory cells resembling caseous tuberculosis. The necrotic center was

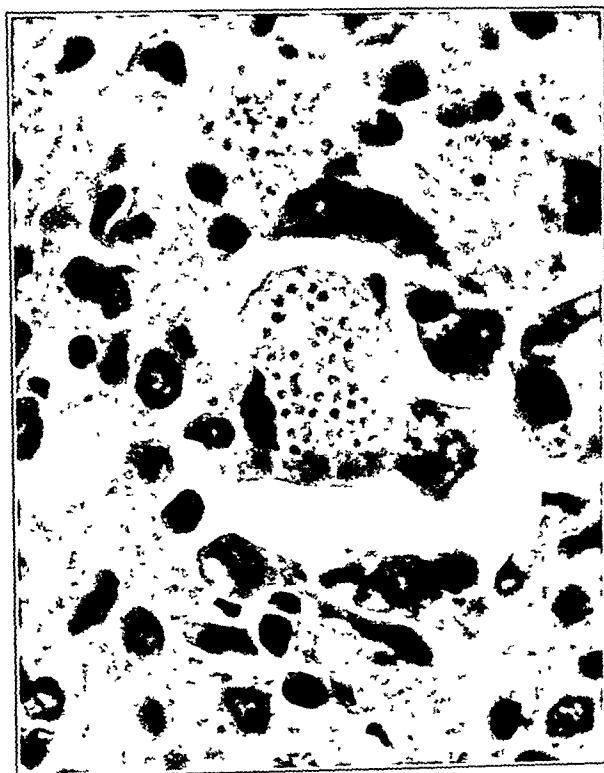


Fig. 1.—Parasitized macrophages in the base of an ulcer in the ileum. Note the characteristic, clear halo surrounding the dark staining nucleus; $\times 1,000$.

was a base of granulation tissue in which numerous parasitized phagocytes were found (fig. 1). An occasional mucosal epithelial cell contained parasites. The cellular reaction surrounding the ulcer was granulomatous. The predominating cells were macrophages, plasma cells and lymphocytes. At a distance from the areas of ulceration there were accumulations of chronic

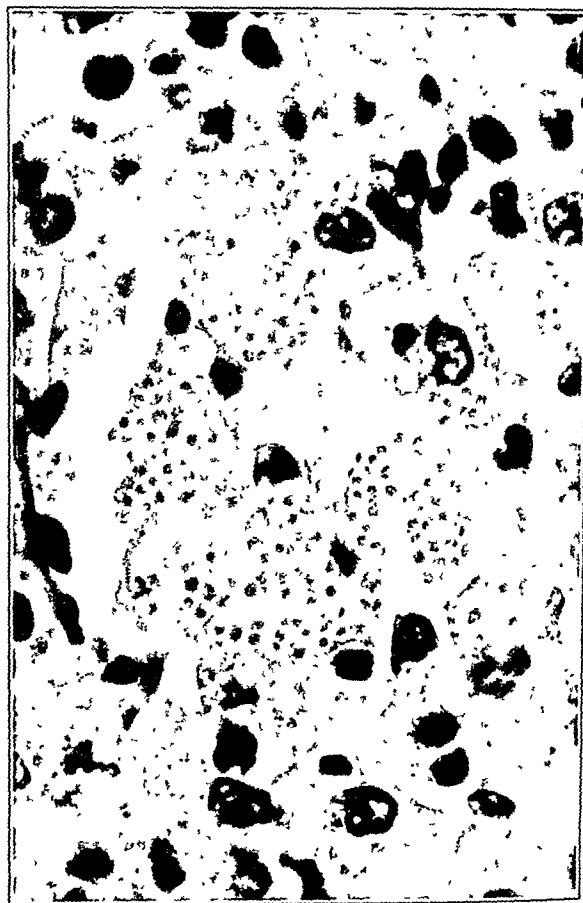


Fig. 2.—Parasitized phagocytes at the edge of the lesion in the adrenal. $\times 1,000$.

composed of cellular debris honeycombed with round vacuoles corresponding in size to the yeast bodies. None of these vacuoles contained nuclei. Numerous parasitized phagocytes were present in the inflammatory wall (fig. 2).

Mesenteric lymph nodes showed circumscribed tubercle-like lesions with little necrosis. Occasional giant cells were seen. Numerous parasitized phagocytes were present at the edges of these lesions. There was a generalized reticuloendothelial hyperplasia.

Many small tubercle-like lesions were seen in the spleen and liver (figs. 3 and 4). They contained a central core of epithelioid cells with a peripheral ring of fibrous tissue. An occasional central giant cell was present in these lesions. Histoplasmas were rare in these lesions but in the giant cells and epithelioid cells definite vacuoles were found corresponding in size with the yeast bodies, some showing bits of degenerating nuclei. Necrosis was not present in these lesions. There was no particular relationship between the location of these pseudo-tubercles and the lobular structures in the liver.

A few small necrotic foci were seen in sections of the kidney and occasional parasitized cells were found in the glomeruli. Sections of lung showed bronchopneumonia, but there was no evidence of involvement with histoplasmas.

The parasite in this case was identical with the organism described by Darling with the exception of the variation in size. This range was much greater than Darling described. The organisms in the intestinal lesions were extremely small,

with eccentrically placed nuclei, while the organisms in the adrenal lesions were somewhat larger and had centrally placed nuclei. There appeared to be an increase in the capsular size with the increase in the size of the organism.

Slides were submitted to Dr. Morris Moore and Dr. W. A. D. Anderson, both of whom considered the intracellular organisms similar to the originally described *Histoplasma capsulatum*.

REVIEW OF LITERATURE

Of 25 cases of histoplasmosis available for careful analysis, ulcerative enteritis of variable extent was found to have been present in 8 cases. In only 2 of these cases, however, was the clinical picture suggestive of chronic enteritis, as it was in the case reported here. In 1 of these cases, and also in our case, "obscure malignancy" was considered as a probable diagnosis. The 8 cases showing intestinal involvement will be reviewed briefly, with particular reference to clinical and pathologic evidence of intestinal involvement.

Darling⁷ found intestinal lesions in 2 of his 3 cases. In his original case there were a few small superficial ulcers 2 to 4 mm. in diameter in the cecum and ileum. In his third case there were fifty or more ulcers involving the entire ileum and the lower two thirds of the jejunum, showing various stages of development from infiltration to ulceration and hemorrhage. He described the various stages of the process beginning with a raised pigmented area several millimeters in diameter which became infiltrated around the periphery, showing necrosis in the center and healing by a puckered, pigmented scar. In these ulcers there were numerous parasitized endothelial cells scattered along the denuded surface and many parasites lying free on the surface.

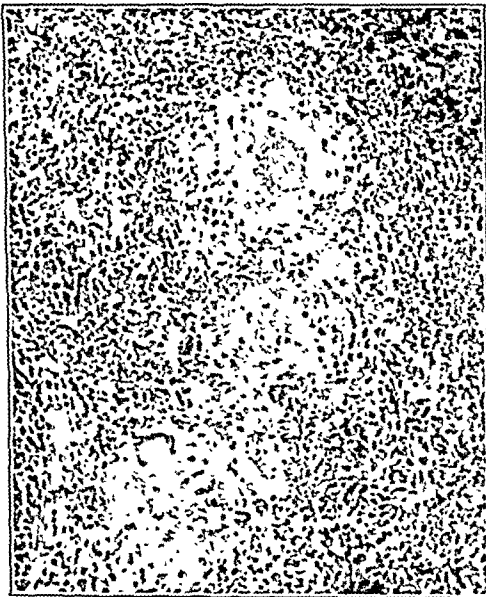


Fig. 3.—Tubercle-like lesions with giant cells in the spleen; $\times 200$.

There was apparently no involvement of the mucosal cells. The histories of both cases were brief and there was no mention of symptoms or conditions referable to the intestinal tract.

Crumrine and Kessel,⁸ reporting the second case of histoplasmosis in the United States, found an extensive ulcerative colitis involving the entire colon and rectum. The patient had complained of epigastric pain, weakness, loss of weight and diarrhea for several months. A tentative diagnosis of an obscure malignant condition

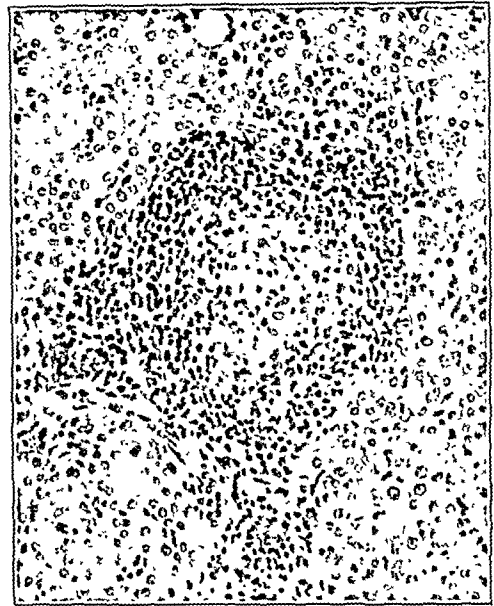


Fig. 4.—Small tubercle with giant cell in the liver; $\times 200$.

was made. There were twenty-five to thirty ulcerated lesions in the rectum and colon varying in size from 1 to 2 cm. in diameter and having red, undermined edges. Fifty smaller lesions, 3 to 4 mm. in diameter, having red borders and a yellowish, necrotic center, showed no loss of overlying epithelium. Numerous mucosal cells as well as phagocytic cells of the submucosa were parasitized.

Agress and Gray⁹ studied a case in which there were slowly healing sores about the lips, ulceration of the buccal mucosa and many tiny, superficial ulcerations through the entire large intestine. Enlarged lymphoid follicles were seen covered with normal mucosa, while in some areas the mucosa was denuded, a shallow ulcer being left extending down to the follicles. Parasitized phagocytes were occasionally seen in these collections of lymphoid tissue. Symptoms referable to the gastrointestinal tract were not present.

Ulcerated areas were found in the intestine in a case reported by Shaffer, Shaul and Mitchell.¹⁰ A dense infiltration of large parasitized cells was found under these ulcerated areas. The accompanying inflammatory reaction was mild. Alternating diarrhea and constipation were present.

A case occurring in Indiana was diagnosed seventeen days before death by Drs. Forry and Culbertson¹¹ after biopsy of a cervical lymph node and careful blood studies. The patient was a 10 year old boy entering the hospital with generalized lymphadenopathy, splenomegaly and signs of sepsis. No evidence of diarrhea

7. Darling, S. T.: Histoplasmosis: A Fatal Infectious Disease Resembling Kala-Azar Found Among the Natives of Tropical America, *Arch. Int. Med.* 2:107-123 (Sept.) 1908; The Morphology of the Parasite (*Histoplasma Capsulatum*) and the Lesions of Histoplasmosis: A Fatal Disease of Tropical America, *J. Exper. Med.* 11:515-531 (July 17) 1909.

8. Crumrine, R. M., and Kessel, J. F.: Histoplasmosis (Darling) Without Splenomegaly, *J. Trop. Med.* 11:435-449 (Nov.) 1931.
9. Agress, H., and Gray, S. H.: Histoplasmosis and Reticulosis, *Am. J. Dis. Child.* 57:573-589 (March) 1939.
10. Shaffer, J. A., Mitchell, R. H., and Mitchell, R. H.: Histoplasmosis of Darling, *J. A. M. A.* 113:484-488 (Aug. 5) 1939.
11. Forry, F., and Culbertson, C. G.: Personal communication to the authors.

was noted. At postmortem examination there was general involvement of the lymph nodes and other organs, the nodes showing patchy areas of necrosis. Throughout the large intestine and ileum there were numerous small nodule-like lesions in the submucosa. The surface was necrotic and excavated over many of these areas.

The case of Brown, Havens and Magath¹² was also diagnosed during life. Their patient complained of a persistent sore throat following extraction of a tooth. Diarrhea developed during the course of the illness. Tissue was removed from pinkish gray, granular, ulcerating lesions on the hard and soft palate which contained parasitized cells. The ulceration extended over the uvula, tonsillar areas and epiglottis and down the larynx to a point 5 cm. below the true vocal cords. In the small intestine from the ligament of Treitz to a point 18 inches (46 cm.) above the ileocecal valve, which also

COMMENT

These cases of histoplasmosis showing intestinal involvement are of importance because of their similarity to other types of ulcerative enteritis. A tabulation of these cases appears in the accompanying table. This condition must be differentiated both clinically and pathologically from amebic and bacillary dysentery, tuberculous enteritis and, in certain cases, from idiopathic ulcerative colitis. The diagnosis depends, except in the latter instance, on the presence of a definite organism, which can be identified on smear or culture of the stool.

In the case reported here, it seems probable that the large macrophages, distended with histoplasmas, were seen in the stool on examination and mistaken for amebas.

Crumrine and Kessel⁸ have mentioned that in all refractory cases of colitis stool examinations for fungi

Cases Showing Gastrointestinal Involvement

Author	Gastrointestinal Symptoms	Other Symptoms and Signs	Location of Intestinal Lesions	Mesenteric Lymph Nodes	Presence of Histo plasmas in Ulcers	Clinical Diagnosis
Darling ⁷ (1908).....	Vomiting	Fever; mental disturbance	Cecum and ileum	Enlarged and pale	No parasites found	Miliary tubercu- losis
Darling ⁷ (1909).....	None	Progressive weakness and emaciation	Jejunum, ileum and colon	Not greatly enlarged; other groups enlarged	Parasitized cells present	None
Crumrine and Kessel ⁸	Pain in epigas- trum; diarrhea	Progressive weakness and loss of weight	Rectum, colon and terminal ileum	Considerable enlargement	Parasitized mucosal and phag- ocytic cells	Obscure malignant condition
Agress and Gray ⁹	None	Recurrent epistaxis, night sweats, no weight gain, etc	Large intestine	Slightly enlarged; whitish cut surface	Parasitized phagocytes in lymph follicles	Congenital syphilis, etc.
Shaffer, Shaul, Mitchell ¹⁰	Vomiting; alter- nating constipation and diarrhea	Fever and drowsi- ness	Intestine	Enlarged and matted together	Parasitized cells below ulceration	Aleukemic leukemia
Forry and Culbertson ¹¹ ..	None	General lymph adenopathy, spleno- megaly and signs of sepsis	Ileum and colon	General lymph- adenopathy	Tissues surround- ing the ulcer contained numer- ous organisms	Histoplasmosis (diagnosis on peripheral blood and lymph nodes)
Brown, Havens, Magath ¹²	Dysphagia and diarrhea	Persistent sore throat	Pharynx, large and small intestine	Moderately enlarged	Numerous parasitized phagocytes	Histoplasmosis (diagnosis on tissue from pharynx)
Anderson, Michelson and Dunn ¹³	Mild transient diarrhea	Draining ear; respiratory infec- tion	Large intestine	Enlarged and firm	Parasitized phagocytes present	Bronchopneumonia with aleukemic leukemia or drug poisoning
Henderson, Pinkerton and Moore	Persistent diarrhea	Weakness	Terminal ileum, cecum and colon	Enlarged and firm	Parasitized phagocytes present	Ulcerative colitis (amebic ?); obscure malignant condition

contained a large ulcer, there were many small, punched-out lesions from 3 mm. to 4 by 2.4 cm in diameter. Some of the ulcers completely encircled the intestine. In the large intestine there were numerous ulcers, some having coalesced. Intracellular and free organisms were found in sections of both pharynx and intestine.

Anderson, Michelson and Dunn¹³ discovered Histoplasma capsulatum in microscopic examinations of an 8 month old infant in which the most prominent clinical feature was a respiratory infection. A month before admission to the hospital there had been a transient diarrhea of three weeks' duration. Small areas of ulceration were present in the large intestine as well as petechial hemorrhages on both the serosal and the mucosal surfaces. These shallow sloping ulcers had a base of granulation tissue in which moderate numbers of parasitized mononuclear phagocytes were found. The pulmonary lesions in this case contained many histoplasmas.

12. Brown, A. E.; Havens, F. Z., and Magath, T. B. Histoplasmosis: Report of a Case, Proc. Staff Meet., Mayo Clin. 15: 812-816 (Dec 18) 1940.
13. Anderson, W. A. D.; Michelson, I. D., and Dunn, T. M. Histoplasmosis in Infancy: Report of a Case, Am J. Clin. Path. 11: 344-355 (April) 1941.

should be made. It is our opinion that more cases of histoplasmosis would be brought to light and more cases of ulcerative enteritis would be cleared up, from a diagnostic standpoint, if this procedure was carried out, the possibility of infection with the pathogenic fungi being kept in mind.

In most cases of histoplasmosis the intestinal lesions have been similar. The usual location is the ileum or the colon. The typical lesions are ulcers, varying in size but eroding only the mucosa and submucosa. The bases of the lesions are granulomatous, showing numerous parasitized phagocytes. Because of the shallow erosion and the large amount of granulation tissue, such complications as perforation and peritonitis are rare. Our case is the only one in which a generalized peritonitis due to perforation of one of the ulcers was present.

The tubercle-like lesions in the spleen and liver have been described in several reports but are not a constant finding. Their size and appearance have suggested sarcoid as well as tuberculosis. These lesions may be the result of systemic infection, as suggested by Meloney,¹⁴ or they may be the result of circulating

14. Meloney, H. E. Personal communication to the author.

by-products from the destruction of the yeast bodies. The latter theory parallels the suggestion of Harrell¹⁵ that the sarcoid lesions are an exaggerated nonspecific response to a lipid fraction of an undiscovered organism. The finding of vacuolated areas corresponding in size to the yeast organisms in mononuclear cells in the lymph nodes suggests that these lesions are probably the result of a systemic spread of small numbers of organisms which are easily killed, the indestructible shell of the organism being left. The same type of vacuole is seen in the necrotic areas of the adrenal lesions, giving a honeycombed appearance to the entire area. Here, however, stages in the destruction of the yeast organisms can be followed by changes in the nuclear material. On the edge of the areas of necrosis phagocytic cells are seen containing many organisms, some showing intact nuclei and others showing various stages in nuclear destruction. Phelps and Mallory¹⁶ have noted this appearance and suggested that the engulfed yeast organisms may be killed but that the phagocytes are unable to digest and get rid of the empty capsules.

The susceptibility of the adrenal tissue to involvement has been stressed by Meleney.¹⁴ Why the adrenal, which so often escapes other systemic infections, should be involved in almost every case of histoplasmosis is still undetermined.

The portal of entry appears to be a controversial point. In cases of severe pulmonary involvement with generalized lymphadenopathy the respiratory route has been suggested. However, the weight of evidence appears to be in favor of the gastrointestinal route, especially in those cases showing ulcerative lesions in the alimentary tract with mesenteric lymphadenopathy. Experimental work bears this out, for DeMonbreun¹⁷ has been able to infect dogs by feeding cultures of the fungus. In a dog having a natural infection, from which the organisms were cultured and studied by DeMonbreun, the histologic evidence pointed to gastrointestinal infection. We have attempted to infect dogs and guinea pigs by intratracheal injection of cultures of the fungus, and although the study is not complete negative results have been observed in all animals sacrificed up to the present time.

That the organism may gain entrance to the body without producing gastrointestinal lesions is shown by a study of DeMonbreun's experiments. The dogs infected by feeding cultures of the fungus and the dog with the natural infection were all free from gastrointestinal lesions, but those showing infection had mesenteric lymphadenopathy with histologic pictures ranging from hyperplasia of the reticuloendothelial cells to an inflammatory process with definite areas of caseation and fibrosis. It is apparent that involvement of mesenteric lymph nodes is some indication of infection by way of the gastrointestinal tract. Thus in many of the cases of pulmonary involvement with mesenteric lymphadenopathy a gastrointestinal portal of entry is suggested.

A review of the literature shows that all except 3 cases showed definite involvement of the mesenteric

lymph nodes. Of these 3 cases, 2 were incompletely studied. Splenectomy was done in the case of Amolsch and Wax,¹⁸ the diagnosis being made on sections of the spleen. This case terminated fatally but postmortem examination was not done. The case of Strong⁴ showed a draining abscess in the chest wall from which the organisms were recovered; autopsy was not done. It is possible that such lesions were overlooked in the case of Phelps and Mallory¹⁶ because of the lack of gross changes in the nodes. It seems probable, therefore, that almost every case of systemic infection occurs through the gastrointestinal tract with spread to the liver, spleen and lungs as a result of hematogenous or lymphohematogenous metastasis.

An attempt to determine the portal of entry by contrasting the estimated age of the lesions at various sites has been made. Humphrey,¹⁹ in a discussion of his second case, used this criterion for establishing the gastrointestinal tract as the portal of entry. We feel, however, that these lesions, like true tubercles, are difficult to evaluate accurately from the point of view of age.

An additional case of histoplasmosis is mentioned here briefly through the courtesy of Dr. Hollis N. Allen²⁰ and Dr. Charles F. Sherwin. An elderly white man in apparently good health presented himself with an ulcerated area on the lateral aspect of the tongue, 1.5 cm. in diameter, suggestive of carcinoma. Biopsy showed a granulomatous lesion with many histoplasma-laden macrophages. The lesion on the tongue cleared up following radium implantation. Several months later the patient died. An autopsy was not obtained.

Van Pernis, Benson and Holinger²¹ have developed a specific, cutaneous test for this disease. It has been successful in experimental and limited clinical usage, according to one of the authors.²² This test may be of particular value as a diagnostic procedure in early cases of histoplasmosis and in cases of intestinal involvement in which other methods are not practical.

SUMMARY

In the case of histoplasmosis presented, the important clinical and pathologic features were those of ulcerative enteritis. A review of the literature shows that 8 out of 25 thoroughly studied cases showed a similar involvement pathologically but that in only 2 of these cases has there been a similar history of severe prolonged diarrhea. Stress is laid on the examination of stools for the presence of *Histoplasma capsulatum*. The histologic picture is discussed with particular reference to the presence of tubercle-like lesions and the apparent absence of definite organisms from the majority of these lesions. The almost constant involvement of the mesenteric lymph nodes is believed to be strong evidence in favor of the gastrointestinal tract as the portal of entry. Experimentally, attempts to infect dogs and guinea pigs by the intratracheal route have not been successful.

In a second case of histoplasmosis briefly mentioned, diagnosis was made by biopsy of a lesion on the tongue clinically suggestive of carcinoma.

1402 South Grand Boulevard.

15. Harrell, G. T.: Generalized Sarcoidosis of Boeck, *Arch. Int. Med.* 65: 1003-1034 (May) 1940.

16. Phelps, B. B., and Mallory, F. B.: Toxic Cirrhosis and Primary Liver Cell Carcinoma Complicated by Histoplasmosis of the Lung, in Fifteenth Annual Report of the United States Fruit Company, Medical Department, 1926, pp. 115-122.

17. DeMonbreun, W. A.: The Dog as a Natural Host for *Histoplasma Capsulatum*, *Am. J. Trop. Med.* 10: 565-587 (Nov.) 1939.

18. Amolsch, A. L., and Wax, I. H.: Histoplasmosis in Infancy: Report of a Case, *Am. J. Pa.* 1: 1.

19. Humphrey, A. A.: Histoplasmosis, *Arch. Int. Med.* 65: 902-918 (May) 1940.

20. Allen, H. N.: Personal communication to the authors.

21. Van Pernis, Paul A.; Benson, Miriam E., and Holinger, Paul H.: Specific Cutaneous Reactions with Histoplasmosis, *J. A. M. A.* 117: 436-437 (Aug. 9) 1941.

22. Van Pernis, Paul A.: Personal communication to the authors.

Clinical Notes, Suggestions and New Instruments

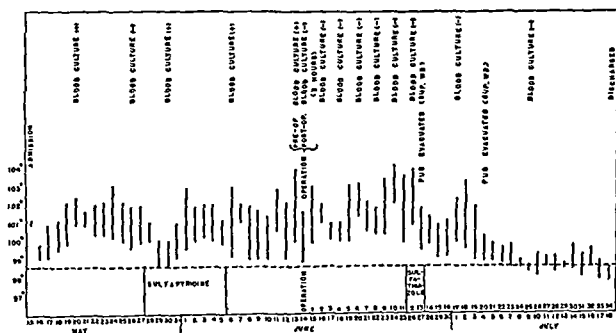
OPERATIVE CURE OF SUBACUTE STREPTOCOCCUS VIRIDANS ENDARTERITIS SUPERIMPOSED ON PATENT DUCTUS ARTERIOSUS

REPORT OF THE SECOND SUCCESSFUL CASE

ARTHUR S. W. TOUROFF, M.D.; HARRY VESELL, M.D.,
AND JULIUS CHASNOFF, M.D., NEW YORK

Subacute Streptococcus viridans endarteritis is one of the two most common serious complications of patent ductus arteriosus. The first operative cure of subacute Streptococcus viridans endarteritis complicating patent ductus arteriosus to be recorded in the literature was reported by two of us in October 1940.¹ Proof of the patient's recovery is afforded by the fact that she has remained entirely well and that all blood cultures have been sterile since the operation almost two years ago.

Since this case was reported, no other instance of operative cure of subacute Streptococcus viridans infection superimposed on patent ductus arteriosus has been recorded in the literature. Under the circumstances, it appears warranted to report our second successful case in the hope of encouraging others to undertake surgical therapy in suitable cases.



Clinical course of patient during her stay in the hospital.

REPORT OF CASE

History.—F. S., a native born white woman aged 29, single, an inspector of wearing apparel, was admitted to the orthopedic service of Beth Israel Hospital May 15, 1941, because of a suspected fracture of the sacrum.

Ten days prior to admission while climbing a flight of stairs she stumbled and, in an attempt to avoid a fall, twisted her body violently. Soon thereafter she suffered such severe pain in the region of the left hip that she was forced to take to bed. In spite of rest in bed for a week, the pain remained constant. Accordingly, the presence of a fracture was suspected and roentgen examination was advised. When the latter was reported to have disclosed a "possible fracture of the sacrum," the patient was referred to the hospital for treatment.

The past history revealed that, when she was 8 years old, a school physician discovered that she had a cardiac murmur. She was told that this was of congenital origin. She did not know whether she had been a "blue baby." She stated that as a child she was conscious of a "buzzing noise" in her chest but that this had disappeared as she grew older. While at school she participated actively in all games and never was aware of undue fatigue or shortness of breath on exertion. After completing her primary school education she attended high school for two years and then left to earn her own living. During the succeeding years she remained entirely well except

for occasional headaches, which were ascribed by her physician to nasal polyps. The surgical history was negative except for a tonsillectomy performed during childhood.

Examination.—The patient was well developed and well nourished, her weight being 130 pounds (59 Kg.). She did not appear to be either acutely or chronically ill and had no complaint other than that of pain in the region of the left hip when she moved about in bed. The temperature on admission was 101.2 F., the pulse rate 88 and the respiratory rate 24. On orthopedic examination, the positive findings consisted of tenderness on pressure over the left buttock near the ischial tuberosity and pain over the hip on flexion of the thigh and inversion of the knee. The remainder of the physical examination was not remarkable except for the presence of a cardiac murmur to be described later.

The diagnosis made was (1) a sprain of the short muscles of the left hip and (2) congenital heart disease—patent ductus arteriosus.

After roentgen examination of the pelvis, femurs and lumbar vertebrae had proved negative, bed rest and infra-red therapy were instituted. During the patient's first five days in the hospital the temperature ranged irregularly between 99 and 102.4 F., and the pulse rate between 88 and 116. In spite of the fever, she felt entirely well except for pain in the hip. In an attempt to ascertain the cause of the continuing fever, which appeared to be unrelated to the orthopedic condition, medical consultation was requested.

On examination by one of us (J. C.), the patient did not appear ill. There was no dyspnea or cyanosis. The pharynx was not injected. The teeth were in good repair. The cervical lymph glands were not palpable. Petechiae were not noted in the fundi or conjunctivas, or on the trunk or extremities. The heart was not enlarged. Over the second interspace, about 3 to 4 cm. to the left of the midsternal line, a faint thrill was noted during systole and diastole. In the same area a rough continuous "machinery" murmur was heard. This was transmitted downward to the third interspace and upward to the region of the clavicle. The systolic component was transmitted to the aortic area and was heard faintly over the vessels of the neck. The diastolic component was transmitted only as far as the left sternal border. The heart sounds were detectable posteriorly, mesial to the vertebral border of the left scapula, but no murmurs were heard in this area. The second aortic sound was slightly accentuated; the second pulmonic sound was normal.

The lungs were clear; the cervical veins were not unduly filled and the liver was not palpable. There was no edema or other evidence of cardiac failure. The spleen was not palpable. There was no clubbing of the fingers. The blood pressure was 114 systolic and 60 diastolic in the right arm and 106 systolic and 60 diastolic in the left.

The tentative diagnosis of subacute Streptococcus viridans endarteritis complicating patent ductus arteriosus was made. A blood culture was ordered immediately. After several days the latter was reported positive for Streptococcus viridans (15 colonies per cubic centimeter). Twelve days after admission to the hospital, the patient was transferred to the medical service for further investigation.

Laboratory Data.—A teleroentgenogram revealed the cardiac shadow to be relatively small. The contour was somewhat deformed owing to distinct prominence in the region of the pulmonic arc suggestive of dilatation of the pulmonary artery. The ascending curve of the aortic arch was inconspicuous. The right ventricle was not enlarged. The four lead electrocardiogram was normal. Axis deviation was not noted. A phonocardiogram revealed the murmur over the pulmonic area to be continuous through systole and diastole. The specific gravity of the urine ranged up to 1.026. A faint trace of albumin was present on several occasions. Rarely a red blood cell was noted in a low power field in the uncatheterized specimen from time to time. No casts were found. The blood contained 4,240,000 red cells per cubic millimeter. The hemoglobin content was 80 per cent. There were 7,100 white cells, of which 75 per cent were polymorphonuclear leukocytes and

From the Medical Service of Dr. I. W. Held and the Thoracic Surgical Service of Dr. Arthur S. W. Touroff, Beth Israel Hospital.
J. Touroff, A. S. W., and Vesell, Harry: Subacute Streptococcus Viridans Endarteritis Complicating Patent Ductus Arteriosus, J. A. M. A. 115: 1270 (Oct. 12) 1940.

25 per cent mononuclear cells. The erythrocyte sedimentation rate on two occasions was 50 and 37 mm. in forty-five minutes. Blood volume was 3,000 cc., plasma volume 2,000 cc. The Wassermann, Kline and Kahn tests gave negative results. Additional blood cultures, taken on the twelfth, sixteenth and twenty-third day of observation, revealed 0, 100 and 177 colonies of *Streptococcus viridans* per cubic centimeter, respectively, after forty-eight hours of incubation.

During a thirty-one day period of preoperative observation, the temperature varied between 98.6 and 104 F., and the spleen became palpable. Chemotherapy was instituted thirteen days after admission to the hospital. In three days, 16 Gm. of sulfapyridine was administered by mouth, and a blood concentration of 6.6 Gm. per hundred cubic centimeters was established. Severe nausea and vomiting then supervened and necessitated discontinuance of oral administration of the drug. During the three day period in which sulfapyridine was administered, the temperature fell to a somewhat lower level, but a blood culture taken on the last day revealed 100 colonies of *Streptococcus viridans* per cubic centimeter after forty-eight hours of incubation. During the next four days a total of 36 Gm. of the drug was administered by rectum. Oral administration then was reinstituted but had to be discontinued because of recurrence of nausea and vomiting after 8 Gm. of the drug had been given in two days. A blood culture taken the next day revealed 177 colonies of *Streptococcus viridans* per cubic centimeter after forty-eight hours of incubation. By this time (about three and one-half weeks after admission), the patient's general condition had deteriorated considerably; the prominent clinical manifestations were loss of weight and strength, progressive anemia and a continuously septic temperature.

As in other cases that we have reported,² the outlook for recovery under medical therapy did not appear encouraging. Accordingly, after being unable to detect evidence of other associated congenital cardiac defects and valvular lesions, surgical treatment was considered. Although the exact duration of the infection was unknown, the short clinical course and the lack of evidence of extension of vegetations to the aorta and the left side of the heart, together with the lack of evidence of peripheral embolization and petechiae, seemed to indicate that the infection in all probability was of relatively recent origin. It was for the latter reason particularly that operation appeared to offer a fair chance of success.

Operation.—A blood culture taken on June 14, 1941 at 9 a. m. revealed 80 colonies of *Streptococcus viridans* per cubic centimeter after forty-eight hours of incubation. In the afternoon of the same day, operation was performed (by A. S. W. T.) under cyclopropane anesthesia. A left-sided anterior thoracic incision was made in the second intercostal space. The second and third costal cartilages were divided and the pleural cavity was entered. The edges of the wound were retracted widely and the lung was permitted to collapse in order to expose the aortic arch and the left pulmonary pedicle. A well defined tremor and thrill were present over the base of the heart and pulmonary artery. These phenomena were not noted in the region of the apex. A vertical incision was made in the mediastinal pleura, and the under surface of the aortic arch and the adjacent pulmonary artery were dissected free from one another in order to expose the ductus arteriosus. The aorta measured 1 inch (2.5 cm.) in diameter and the pulmonary artery $1\frac{1}{2}$ inches (3.8 cm.) in diameter. The ductus measured approximately $\frac{3}{8}$ inch (1 cm.) long and $\frac{1}{2}$ inch (1.3 cm.) in diameter. When the ductus was compressed, the pulse rate was not slowed appreciably, but the diastolic pressure rose approximately 20 mm. of mercury. The recurrent laryngeal nerve was dissected out carefully and retracted laterally. The ductus then was stripped free on its upper, lower and antero-lateral surfaces. As was noted in the cases of infectious involvement which we reported previously,² the posteromesial surface of the ductus was adherent to the adjoining structures. A plane of dissection was entered within the adventitia of the

aorta, near the angle between the under surface of the aortic arch and the upper surface of the ductus. The dissection then was carried downward and laterally behind the aortic arch within the adventitia of the aorta immediately adjacent to the ductus. The same plane within the aortic adventitia was entered near the lower surface of the ductus and dissection carried upward and mesially beyond the aortic arch until the posterior surface of the latter, immediately adjacent to the ductus, was entirely free. The plane of separation then was developed for a short distance behind the posteromesial surface of the ductus, thus completely freeing the latter in the region adjacent to the aorta.³

Two heavy silk ligatures were next passed beneath the freed ductus on an aneurysm needle. The pulse rate at this juncture was 150 and the blood pressure 150 systolic and 80 diastolic. Both ligatures then were tied snugly alongside one another. After ductal ligation, the pulse rate fell to 120, the blood pressure rose to 154 systolic and 96 diastolic, and the thrill and bruit disappeared. The incision in the mediastinal pleura was left open, and the thorax was closed in layers. Immediately before the thoracic closure was completed the lung was expanded by positive pressure. The patient left the operating room in good condition, the pulse rate being 120 and of good quality.

Postoperative Course.—The immediate reaction to operation was good. The temperature, which had been almost 104 F. on the day preceding operation, declined during the first four days. However, it then again became irregular. On the fifth postoperative day, 700 cc. of blood-tinged fluid, which subsequently was reported to be sterile, was aspirated from the left side of the chest.

Nine postoperative blood cultures were taken, and all remained sterile throughout three and one-half to four weeks of incubation. The first culture was taken three hours after completion of the operation and the succeeding cultures on the second, fourth, sixth, eighth, tenth, twelfth, seventeenth and twenty-fifth postoperative days, respectively. Some of these blood specimens were arterial as well as venous.

In view of the repeatedly sterile blood cultures and the fact that the patient appeared to be improving progressively in spite of the irregular temperature, it appeared warranted to assume that the continued fever was not due to the persistence of the original infection. Accordingly a careful search was made daily for some other cause, without success. Finally, on the twelfth postoperative day, the administration of sulfathiazole was begun. On the following day evidence of infection of the superficial wound was discovered, some pus was evacuated from the healed operative incision and the use of sulfathiazole was discontinued at once. One week later an adjacent, small, purulent collection was evacuated, following which the temperature subsided satisfactorily. It is to be emphasized that the total quantity of sulfathiazole administered following operation was 10 Gm. and that all blood cultures (six) taken up to the time of the administration of the drug previously had been reported sterile. Under the circumstances, it is entirely justifiable to state that the use of sulfathiazole was not responsible for recovery from the *Streptococcus viridans* infection.

When the patient was discharged from the hospital on the thirty-fourth postoperative day, after fourteen days of almost

3. The technic of freeing the ductus, described here and to be reported in greater detail in a forthcoming article, was employed in an attempt to minimize the likelihood of accidental hemorrhage. As was pointed out in a previous communication,² when infection supervenes in cases of patent ductus, the latter structure often becomes friable as the result of infectious changes. Furthermore, periarthritis occurs not infrequently and results in firm adherence of the ductus to the surrounding structures, especially to the right branch of the pulmonary artery that lies behind it. Thus in separating the posteromesial wall of the ductus from the right branch of the pulmonary artery, both the ductus and the immediately adjacent pulmonary artery may be torn. This accident may result in serious and often fatal hemorrhage. Since the walls of the ductus are thickest and strongest immediately adjacent to the aorta, the chances of accidentally tearing the ductus are minimized by confining the dissection to this area. Furthermore, in this region the right branch of the pulmonary artery diverges from the ductus, and thus the chances of accidentally tearing the former structure during the dissection also are reduced. In view of the not infrequent difficulty of establishing, with the commonly employed technic, a complete plane of cleavage behind the ductus, an apparently safer method is to begin and to complete the dissection on the aorta as described and then to continue it behind the adjoining posteromesial wall of the ductus itself.

2. Touroff, A. S. W., and Vesell, Harry: Experiences in the Surgical Treatment of Subacute *Streptococcus Viridans* Endarteritis Complicating Patent Ductus Arteriosus. *J. Thoracic Surg.* 10: 59 (Oct.) 1940.

normal temperature, she was symptom free, the wound was well healed and she appeared in good physical condition. She then was referred to a convalescent home with instructions to return to the hospital in four weeks. During a thirty-one day stay in the country, she gained 8 pounds (3,629 Gm.) and felt entirely well except for occasional pain in the healed operative wound.

On readmission to the hospital for a check-up examination, sixty-five days after the operation, she was entirely symptom free. Physical examination was negative except for the presence of a short, slightly rough systolic murmur at the second intercostal space immediately to the left of the sternum. This murmur was not transmitted. The spleen no longer was palpable. The blood contained 4,500,000 red blood cells per cubic millimeter. The hemoglobin content was 98 per cent. There were 6,000 white blood cells, of which 42 per cent were polymorphonuclear leukocytes and 58 per cent mononuclear cells. The erythrocyte sedimentation rate was 11 mm. in forty-five minutes. The blood pressure was 118 systolic and 78 diastolic. Circulation time, venous pressure and blood volume were normal. The urine revealed no red blood cells or albumin. Three blood cultures taken forty-eight hours apart, including one arterial specimen, were sterile. Roentgen examination revealed the contour of the heart to have become practically normal. Kymographic examination disclosed that the pulsation of the pulmonary artery was of about the same amplitude as that of the aorta. The ventricular movement was normal. The electrocardiogram revealed only slight changes, as compared with the one taken before operation. The cardiac rate now was 75 instead of 111. There was some elevation of RT and an increase in amplitude of T in the limb leads. A small Q₃ was present. The chest leads CF 4 were similar. CF 1, 2, 3, 4 and 5 were normal.

On the basis of these observations, the assumption that the bacterial infection had not recurred was warranted. Accordingly the patient was discharged. When last examined on December 6, twenty-five weeks after operation, she appeared in excellent health and was employed steadily. Her weight was 131½ pounds (59.6 Kg.).

SUMMARY

A woman aged 29 with a congenital cardiac lesion, discovered during childhood, came under observation because of a suspected traumatic fracture of the sacrum. After investigation had failed to disclose such a fracture the diagnosis of a sprain of the short muscles of the left hip was made. Because of the presence of irregular fever, which did not appear to be related to the orthopedic condition, further investigation was carried out and the diagnosis of patent ductus arteriosus with superimposed subacute *Streptococcus viridans* endarteritis was established. During a thirty-one day period of hospital observation, the clinical course was one of sepsis and progressive deterioration. Blood cultures revealed as many as 177 colonies of *Streptococcus viridans* per cubic centimeter. Sulfapyridine was administered for nine days, but the use of the drug had to be terminated abruptly because of intractable nausea and vomiting. Accordingly, after no evidence of associated congenital cardiac defects or valvular lesions was found, surgical ligation of the ductus was undertaken in the hope of eliminating the infection. Operation was performed by a modified technic calculated to reduce the likelihood of accidental hemorrhage. The post-operative course, except for the occurrence of infection of the superficial wound, was uneventful. A blood culture taken three hours after operation and eleven blood cultures taken subsequently were sterile. Twenty-five weeks have elapsed since the operation and the patient remains well.

This is the second case in which operation on a patient suffering from patent ductus arteriosus complicated by subacute *Streptococcus viridans* endarteritis has resulted in recovery from the bacterial infection.

CONCLUSIONS

The recovery, following an operation, of a second patient with patent ductus arteriosus complicated by subacute *Streptococcus viridans* endarteritis appears to indicate that such results are not fortuitous. By tending to support further our original contention that surgical treatment is a logical form of therapy in this disease, it should encourage others to operate during

the early stages of infection if other methods fail to result in prompt recovery.

ADDENDUM.—Two patients with subacute *Streptococcus viridans* endarteritis superimposed on patent ductus arteriosus have been operated on since this paper was written. Both have had repeatedly negative blood cultures since operation and apparently have recovered completely. In neither case were sulfonamide drugs employed postoperatively.

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SULFATHIAZOLE AS AN ADJUNCT TO SURGERY IN ADVANCED ACUTE APPENDICITIS

ROBERT K. ANDERSON, M.D., CHICAGO

In a series of 206 patients with appendicitis operated on at the Norwegian-American Hospital between May 1 and Oct. 17, 1941 there were 22 (10.6 per cent) with advanced disease of the appendix. These patients were treated with sulfathiazole as an adjunct to surgery. In this group there was 1 death.

The severity of the disease in these 22 cases of appendicitis may be appreciated by the following data: The average duration of illness (excluding 1 case of twenty-one days' duration) before operation was seventy-one and one-half hours. Eleven of the patients had a perforated appendix, 7 had a gangrenous appendix, 3 had advanced, acutely inflamed, suppurative appendicitis, and 1 had an inflammatory mass with abscess involving the ileocecal junction.

In 18 cases the sulfathiazole was used immediately as an adjunct to surgery. In this group sulfathiazole was given intraperitoneally in 17 cases and in 5 of these additional sulfathiazole was given intravenously or orally. The average total dose in this group was 14.3 Gm. The average duration of hospitalization in this group was fourteen days. Complications were few. In 15 cases there were no complications. In 1 case pleurisy developed, in 1 an infected wound developed which drained for several weeks and in 1 hyperpyrexia and convulsions developed which resulted in death. This child, aged 5 years, was ill for thirty-two hours before operation. A perforated appendix was found. Five Gm. of the medication was given intraperitoneally and death occurred twenty hours after the operation. The development of convulsions was unusual and unexplainable. Detailed studies were not possible and the exact cause of death remains unknown. Permission for autopsy was not secured.

In 4 cases sulfathiazole was used late following operation in the treatment of complications of appendicitis. In 2 a local peritonitis developed followed by large abdominal abscesses of the wall; in 1 a pelvic abscess developed which finally perforated into the rectum and drained spontaneously, and in 1 peritonitis developed followed later by a pleurisy. In this group the sulfathiazole was given orally and intravenously as sodium sulfathiazole. The average dose was 35 Gm. The average duration of hospitalization was twenty-eight days and in all cases recovery finally occurred.

RESULTS

1. In this series of 22 patients with advanced disease of the appendix treated by removal of the appendix and with sulfathiazole medication there was 1 death, a mortality of 4.5 per cent.

2. In the cases in which sulfathiazole was used immediately there was a relatively short period of hospitalization—fourteen days.

3. In the cases in which sulfathiazole was used immediately there were few complications, 3 in 18 cases.

4. It was found that immediate use of from 8 to 10 Gm. intraperitoneally and 2 Gm. in the abdominal wall was most effective.

CONCLUSIONS

Sulfathiazole is an effective adjunct to surgery in cases of severe advanced acute appendicitis and in the complications of appendicitis.

1044 North Francisco Avenue.

The attending surgeons of the Norwegian-American Hospital will be the author to report on their cases.

CEREBRAL NECROSIS IN SICKLE CELL DISEASE

JOHN H. CONNELL, M.D., NEW ORLEANS

Since Herrick in 1910 first pointed out the peculiar sickling tendency of red blood cells in the condition now generally (though inaccurately) called sickle cell anemia, various clinical manifestations of the disease have been recognized, and systemic involvement is probably much commoner than is usually realized. Few cases of involvement of the central nervous system have been recorded in the literature, and for this reason I am putting on record the following case of sickle cell disease with neurologic phenomena in which extensive cerebral necrosis due to the sickling tendency of the red blood cells was found at autopsy.

REPORT OF CASE

A. J., a Negro woman aged 20, unmarried, entered the Huey P. Long Hospital at Pineville, La., Aug. 28, 1941 and died three days later. The history was not satisfactory. She complained chiefly of headache, right-sided deafness and drowsiness. The headache and deafness had appeared at the same time, about six days previously, and the drowsiness a few hours later. The headache, which had been continuous, was limited to the left side. The patient also suffered from extreme anorexia, and any movement, even about the bed, caused nausea and vomiting. She had become increasingly more weak since the onset of the illness.

There had been no similar attack in the past, but six years before the present illness the patient had had an attack of what she described as rheumatism accompanied by left-sided paralysis. Recovery had been complete except for a residual weakness of the left arm and leg. There was no history of syphilis and her menstrual history was without incident.

On physical examination the patient was drowsy and seemed quite ill but could be roused, and when roused she answered questions coherently. The temperature was 100 F., the pulse rate 68 per minute and regular and the blood pressure 125

showed the fluid to be under normal pressure (5 mm. of mercury). The cell count was less than 10 and the test for globulin was negative. Examination of the blood showed hemoglobin 60 per cent (10.4 Gm.), 3,450,000 red cells and 14,150 white cells per cubic millimeter and 87 per cent polymorphonuclear cells. The sedimentation rate was forty minutes. The

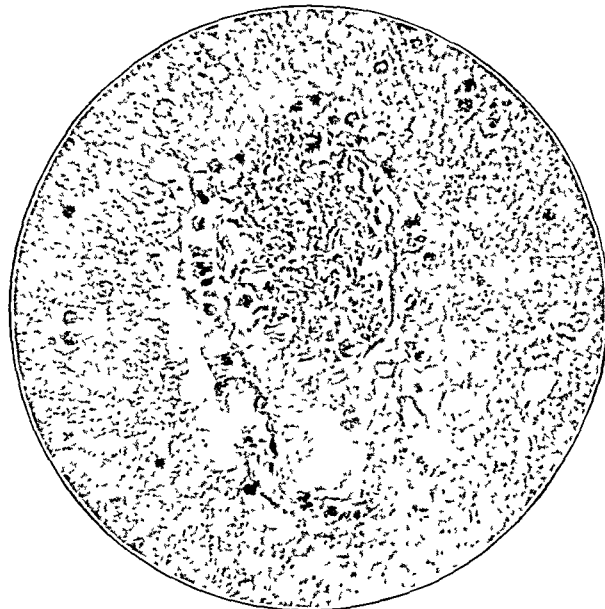


Fig. 2.—Section from edge of necrotic area in left hemisphere, showing sickled red cells forming a thrombus which is undergoing organization. The surrounding brain tissue shows degenerative changes.

nonprotein nitrogen was 37 mg. per hundred cubic centimeters of blood and the dextrose 87 mg. per hundred cubic centimeters.

Three days after she had been admitted to the hospital, and before a diagnosis had been made, the patient suddenly became comatose. Examination at this time showed the left pupil larger than the right; it did not react to light. The neck was somewhat stiff and a pharyngeal paralysis was soon manifested by considerable amounts of mucus in the throat. No abdominal reflexes could be elicited and all the other reflexes were weak. The temperature promptly rose to 104.6 F., the pulse rate to 120 and the respiratory rate to 60 a minute. Examination of the spinal fluid again showed the cell count to be less than 10 and the test for globulin was again negative, but the fluid, although clear, was now under increased pressure (20 mm. of mercury). The temperature was 105.5 F. and the pulse rate 150 a minute when the patient died twelve hours after the onset of the coma.

Autopsy.—Postmortem examination, which was performed three hours after death, revealed no conditions of importance to the present discussion except in the spleen and the brain. The spleen, on gross examination, appeared to be a brown fibrotic piece of tissue, a sort of miniature organ weighing only 2 Gm. Its appearance immediately suggested the diagnosis of sickle cell disease; blood smears were taken and on examination later revealed a severe degree of sickling (fig. 1).

Examination of the skull showed no changes in the external or internal surface. The entire brain appeared edematous. The dura was considerably thickened and pigmented throughout, the pigmentation being especially noticeable in the region of the midbrain. The right cerebral hemisphere was somewhat smaller than the left. Sections revealed (1) massive necrosis of the left cerebral hemisphere, chiefly involving the white matter but also impinging on the gray, though sparing the corpus callosum and other major nerve tracts (there was a firm red blood clot in the left middle cerebral artery); (2) an old cystic pigmented lesion 5 cm. in its largest diameter in the right cerebral hemisphere, with destruction of considerable white matter, and (3) an old cystic pigmented lesion 2 cm. in its largest diameter in the right cerebellar lobe.

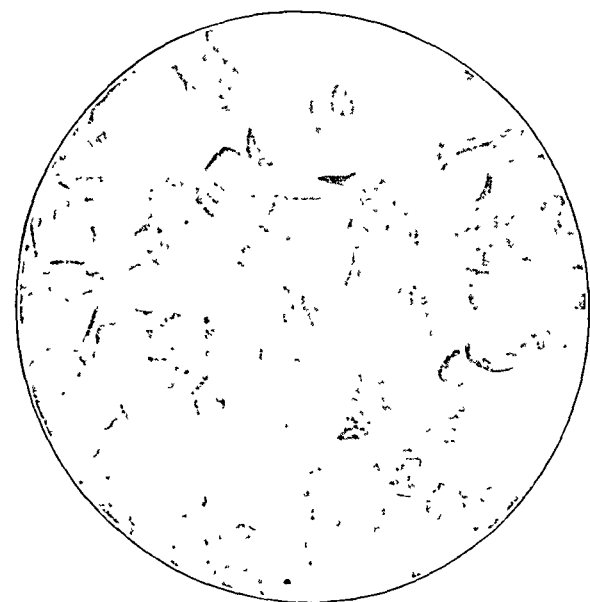


Fig. 1.—Blood smear taken at autopsy, showing a severe degree of all types of sickling.

systolic and 75 diastolic. The pupils were equal and reacted to light and in accommodation. The hearing in the left ear was unimpaired but the patient was almost totally deaf in the right ear. The reflexes were sluggish but equal. The examination otherwise revealed only the residual weakness of the left arm and leg already mentioned.

The blood Wassermann reaction was negative. Spinal puncture shortly after the patient was admitted to the hospital

Microscopic examination of the various organs revealed only passive congestion except in the spleen and the brain. In the spleen the normal tissue had been completely replaced by pigmented fibrous tissue.

Examination of the brain tissue adjacent to the old cystic lesions in the right hemisphere and cerebellum showed atrophic changes and corpora amylacea. Endothelial proliferation and hyalinization were observed in the smaller arterioles. The neurogenic macrophages contained pigment. Tissue from the left hemisphere showed massive necrosis with the usual attendant inflammatory reaction. Sections through a terminal portion of the left middle cerebral artery showed a red thrombus with beginning organization and with resultant parenchymal atrophy of the adjacent brain tissue. All the vessels in the brain were filled with greatly distorted sickled red blood cells (fig. 2).

COMMENT

Sicklemia, or the tendency of blood to sickle, is a constitutional tendency to abnormal erythropoiesis, that is the production of elongated, semilunar erythrocytes which are destroyed by the body defenses as abnormal cells. The disease, which is inherited as a dominant mendelian characteristic, is seen chiefly in the pure Mediterranean races and in the American Negro, in whom the tendency is reported to exist in 7.5 per cent of all members of the race.

The single constant finding associated with sicklemia is anemia due to destruction of the red blood cells by the body defenses. Actually, however, the anemia is seldom severe and is only rarely the cause of death, so that the term sickle cell anemia, by which the disease is generally known, is really misleading in that it directs the attention away from more important considerations. Far more important from the pathologic point of view is the fact that in this disease the elliptic blood cells which occur are poorly adapted, because of their shape, to pass through the circulation, which is really a circuit of tubular conduits. As a result, the red cells stagnate in certain parts of the blood stream, obstruction follows and a state of local anoxemia develops which causes still further alterations in the shape of the red blood cells. The smaller arterioles become occluded and the consequent thrombosis terminates in local ischemia and necrosis, especially in areas in which there is an inadequate collateral circulation. The essential pathologic process is the same in all organs, though it is conditioned by the local anatomy. Thus the jaundice by which excessive hemolysis is manifested is due to stagnation in the spleen, which causes first congestion and enlargement and then what amounts to secondary destruction of the organ, as in this case. Renal infarction and mesenteric infarction can be explained on the same basis, and Vance and Fisher¹ have recently pointed out that thrombotic lesions in the bone marrow may cause fat embolism.

In view of these facts, which are now quite well known, it is surprising that more attention has not been paid to the tissues of the body which are most sensitive to even temporary anoxemia, that is the tissues of the nervous system. Yet involvement of the central nervous system in cases of sickle cell disease does not seem even to have been mentioned in the literature until 1923, when Sydenstricker, Mulherin and Houseal² reported a fatal instance in a 5 year old Negro boy. To date only 31 cases have been recorded, 6 of which were reported by Hughes, Diggs and Gillespie,³ who also collected and analyzed the 25 cases previously reported. Morphologic changes in the brain were reported at autopsy in only 7 cases, and in only 4 of the 7 (reported by Cook,⁴ Ford⁵ and Hughes and his associates³) was the association noted of cerebral necrosis and focal symptoms. So far as can be determined,

the case which I am reporting at this time is the fifth recorded instance of cerebral necrosis associated with sickle cell disease and is apparently the most severe to be put on record.

I observed no similar case during the course of a rather extensive experience on Negro subjects with sickle cell disease submitted to autopsy in the Charity Hospital of Louisiana at New Orleans over a recent ten year period. I believe, however, that this was not because such cases did not occur but because lesions in the central nervous system were not borne in mind and consistently looked for. A retrospective analysis of symptoms in many cases of sickle cell disease observed at autopsy leads me to believe that cerebral lesions probably existed in a number of instances and would have been found if only they had been sought.

Because of the multiplicity of cerebral functions, the symptomatology of cerebral involvement in sickle cell disease is unpredictable. Hughes and his associates, on the basis of the 31 cases which they observed or collected, listed the most important symptoms, in the order of frequency, as drowsiness or coma, hemiplegia, aphasia, headache, convulsions, stiffness or pain in the back and neck, abdominal pain, irritability, facial weakness, pain and stiffness in the legs and back, ocular disturbances and vomiting. The symptoms vary in intensity. The ultimate prognosis is poor, but temporary recovery frequently ensues. Since the lesions are usually intracranial and hemorrhage is not a factor, examination of the spinal fluid gives no reliable information, though increased pressure was observed several times in the reported cases, as in my own case.

The interpretation of this case is not difficult: A Negro woman had a sickling tendency which was unrecognized during life, including the period of her fatal illness. Six years before this illness, during a period of lowered resistance, which possibly was the result of rheumatic fever, a lesion evidently developed in the right cerebral hemisphere which caused a temporary left hemiplegia. The major nerve tracts and motor areas were not involved, as postmortem examination demonstrated, and the paralysis was therefore not permanent. The episode was typical of sickle cell disease. Its clinical manifestations are apparently precipitated by some intercurrent disease, some surgical or other trauma or any other factor that lowers the patient's resistance. During such periods the tendency to sickling is exacerbated and the morphology of numbers of red blood cells is so altered that adverse physiologic conditions result. In this case the precipitating factor was rheumatic fever and the cerebral lesion was the result.

The patient's history was not satisfactory, but it seems reasonable to assume, in view of the postmortem examination, that during subsequent periods of exacerbation the meninges and cerebellum were involved in the sickle cell disease and the spleen was almost completely obliterated. The last exacerbation, although gradual in onset, was enormous in its final proportions, as shown both by the fatal outcome and by the massive necrosis of the left cerebral hemisphere found at post-mortem examination.

This case is an excellent illustration of the advice given by Bauer⁶ that routine testing of the blood of Negro patients for sickling is more valuable than many other laboratory tests which are far more complicated and time-consuming and which are likely to be used without special indications. In the case here reported, however, the nature of the pathologic process was such that even if the diagnosis had been made the patient's life could not have been saved.⁷

SUMMARY AND CONCLUSIONS

1. A consideration of the fundamental pathologic physiology of sickle cell disease makes it clear that the important pathologic process is not anemia, as the misleading term sickle cell

1. Vance, B. M., and Fisher, R. C.: Sickle Cell Disease: Two Cases, One Presenting Fat Embolism as a Fatal Complication, *Arch. Path.* 32: 378-386 (Sept.) 1941.

2. Sydenstricker, V. P.; Mulherin, W. A., and Houseal, R. W.: Sickle Cell Anemia: Report of Two Cases in Children, with Necropsy in One Case, *Am. J. Dis. Child.* 26: 132-154 (Aug.) 1923.

3. Hughes, J. G.; Diggs, L. W., and Gillespie, C. E.: The Involvement of the Nervous System in Sickle Cell Anemia, *J. Pediat.* 17: 166-184 (Aug.) 1940.

4. Cook, W. C.: A Case of Sickle Cell Anemia with Associated Subarachnoid Hemorrhage, *J. Med.* 11: 541-542 (Dec.) 1930.

5. Ford, F. R.: Diseases of the Nervous System in Infancy, Childhood and Adolescence, Springfield, Charles C. Thomas, Publisher, 1937.

6. Bauer, Julius: Sickle Cell Disease; Pathogenic, Clinical and Therapeutic Considerations, *Arch. Surg.* 41: 1344-1362 (Dec.) 1940.

7. Since this article was written D. W. Walker and J. P. Murphy (J. Pediat. 19: 28 [July] 1941) have reported a case of sickle cell anemia complicated by rheumatic heart disease with cerebral hemorrhage and necrosis. The cause of the cerebral lesion in a child was not understood after autopsy. This is apparently another case in which rheumatic fever caused an exacerbation of the sickling tendency of the red cells with resultant cerebral thrombosis followed by necrosis and hemorrhage.

anemia would imply, but thrombosis. It may therefore involve any organ, particularly any organ with a terminal circulation. If this concept of the disease were generally adopted, antemortem diagnoses would be more frequent.

2. In the light of these basic facts, lesions of the central nervous system are probably not uncommon in sickle cell disease. They are not being recognized because they are not being looked for and not because they do not exist.

3. This is the fifth and apparently the most extensive case of cerebral necrosis associated with sickle cell disease to be recorded.

803 Audubon Building.

Council on Industrial Health

MEDICAL SERVICE IN INDUSTRY

THE COUNCIL ON INDUSTRIAL HEALTH HAS APPROVED THIS ARTICLE AS THE FIFTH IN A SERIES ON MEDICAL SERVICE IN INDUSTRY.

C. M. PETERSON, M.D., Secretary.

OUTLINE OF PROCEDURE FOR PHYSICIANS IN INDUSTRY

The Council on Industrial Health has prepared this outline as a convenient reference and guide for physicians interested in industrial medical relationships. The purpose of medicine in industry is to promote the health and physical well-being of industrial employees. These objectives should be accomplished by:

1. Prevention of disease or injury in industry by establishing proper medical supervision over industrial materials, processes, environments and workers.
2. Health conservation of workers through physical supervision and education.
3. Medical and surgical care to restore health and earning capacity as promptly as possible following industrial accident or disease.

An industrial physician is one who serves employed individuals or groups on authorization of a third party having a valid interest.

DUTIES OF THE PHYSICIAN IN INDUSTRY

Prevention.—The physician should acquaint himself by regular inspections with all materials and processes used in the working environment over which he has supervision, to the end that he may recommend appropriate protection of employees from conditions actually or potentially harmful.

Industrial Physical Examinations.—Preplacement physical examinations should be complete. They should be used only for the purpose of assigning work adjusted to the physical and temperamental fitness of applicants and to maintain safe and healthful employment for all employees.

Subsequent physical examinations should be complete enough to provide positive health protection for all workers and to safeguard the public welfare. Repetition of such physical examinations must be determined by the physician in accordance with specific requirements.

In the interest of completeness and uniformity, physical examination forms are recommended. Personal records of this character are confidential and should always be kept in the custody of the medical department. Access to these records should be granted only on request or consent of the examinee.

The examining physician should acquaint the examinee with the results of all examinations or take steps to refer all conditions requiring correction to the physician of the worker's choice.

Health Education.—The plant physician should take advantage of all opportunities for beneficial instruction of the workmen in hygienic living both in and out of the industrial environment.

Medical and Surgical Care.—1. Treatment of Compensable Injuries and Diseases: The disabled worker should be free to choose his physician from all those licensed doctors of medicine

competent to supply the required services except in situations provided for by chapter III, article VI, section 3 of the Principles of Medical Ethics, which reads as follows:

The phrase "free choice of physician," as applied to contract practice, is defined to mean that degree of freedom in choosing a physician which can be exercised under usual conditions of employment between patient and physician when no third party has a valid interest or intervenes. The interjection of a third party who has a valid interest or who intervenes does not per se cause a contract to be unethical. A "valid interest" is one where, by law or necessity, a third party is legally responsible either for the cost of care or for indemnity. "Intervention" is the voluntary assumption of partial or full financial responsibility for medical care. Intervention shall not proscribe endeavor by component or constituent medical societies to maintain high quality of service rendered by members serving under approved sickness service agreements between such societies and governmental boards or bureaus and approved by the respective societies.

2. Treatment of Noncompensable Injuries and Diseases: The treatment of injuries or diseases not industrially induced is the function of private medical practice. The physician in his industrial relationships should abstain from such services except in the case of:

A. Minor ailments. The physician in industry may treat minor physical disorders which temporarily interfere with an employee's comfort or ability to complete a shift, and for the relief of which he may need immediate medical attention.

B. First aid for urgent sickness. The physician in industry should employ such measures as the emergency dictates in all cases of urgent sickness occurring during working hours on the working premises, until such time as prompt notification of the family physician relieves him of further responsibility.

C. Rehabilitation after sickness and injury. The physician in industry can properly assume responsibility for those phases of rehabilitation after disability industrially induced or otherwise, which progress best under controlled working conditions.

GENERAL RELATIONSHIPS

The Employer.—Adequate industrial medical supervision requires full or part time service of doctors of medicine, depending on size of plant, location, prevalence of dangerous health exposures and other considerations. In every case a physician's relation to industry is improved if he does not solicit the appointment.

Written contracts between a physician and an employer are usually unnecessary. If a contract seems desirable, a copy should be filed with the local county medical society.

The Employee.—Adequate industrial health conservation depends on cooperation from workmen. They must therefore receive the same courtesy and professional honesty as do private patients.

Physicians who serve in industry should not devote time or facilities properly belonging to industrial medical administration to diagnose or treat dependents of employees or members of plant administrative or supervisory staffs, except in the absence of accessible independent private facilities.

Industrial Nurses and Nonprofessional Assistants.—Industrial physicians should be responsible for the proper instruction and subsequent activities of nurses and other assistants. Their functions should be described in clear and comprehensive written orders posted in the medical department. There should be no delegation of services requiring expert medical attention.

Consultants.—Assistance should be asked of consultants in industrial medicine, surgery or hygiene or in the clinical specialties whenever the interests of the workmen demand it. In the control of working environment the same consulting arrangements should be entered into with industrial hygienists and safety engineers.

Official Health Agencies.—The physician in industry should consider himself as a deputy health officer in practice if not in fact. Assistance from bureaus of industrial hygiene in many state and local governments to control healthful working conditions is available. In return the physician in industry should cooperate by accumulating and reporting compilations of dependable data on the relation of occupation to morbidity and mortality.

Workmen's Compensation and Rehabilitation Agencies.—Medical and surgical management in every case of industrial injury or disease should aim to restore the disabled worker to his former earning power and occupation as completely as possible and without unnecessary delay. Concise, dependable

medical reports promptly submitted to those agencies entitled to them are a part of this obligation. In the same way, equitable administration of workmen's compensation rests on medical testimony which adheres closely to reasonable scientific deductions regarding the injury or possible sequelae, to the end that every deserving claim may receive full indemnity under the statutes.

Medical Organizations.—Physicians in industry should participate in the organizational and educational activities of general and special medical societies and of hospitals to the end that the objectives and contributions of industrial health may be recognized and available to the medical profession at large.

Assistance in the organization and conduct of industrial medical services is available from committees on industrial health in many state and county medical societies and from committees representing the specialty groups which make up the Scientific Assembly of the American Medical Association. Specific inquiries on all matters relating to industrial health may be directed to the Council on Industrial Health, American Medical Association, 535 North Dearborn Street, Chicago.

Council on Physical Therapy

THE COUNCIL ON PHYSICAL THERAPY HAS AUTHORIZED PUBLICATION OF THE FOLLOWING REPORT.
HOWARD A. CARTER, Secretary.

VACOLITE MODEL D HEARING AID ACCEPTABLE

Manufacturer: Vacolite Company, 3003 North Henderson Street, Dallas, Texas.

This instrument is of the vacuum tube type. Dimensions and weights of the various parts are as follows:

Microphone and amplifier unit serial number 3112, ovoid shape, $4\frac{1}{2}$ inches by $2\frac{3}{8}$ inches by 1 inch, with knob volume control at bottom of instrument. Weight $5\frac{1}{2}$ ounces.

Crystal receiver, 1 inch diameter by $\frac{3}{16}$ inch thick.

Battery assembly, A and B battery in a single unit, $3\frac{1}{2}$ by $3\frac{1}{2}$ by $1\frac{1}{2}$ inches, weight 11.3 ounces. The A battery is replaceable independently of the B battery.

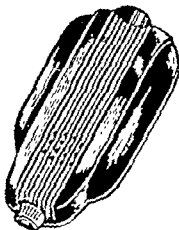
The A battery is 1.5 volts and showed a current drain of 65 milliamperes. The B battery has a voltage of 22 volts and a current drain of 0.24 milliamperes. A 33 volt B battery is the regular size usually furnished.

INTERNAL NOISE

The instrument is fairly quiet, and noise due to impact on microphone and rubbing of the cords is not excessive. The instrument, with fitted earpiece, could be turned full on without feed-back squeal.

ACOUSTICAL GAIN

A patented feature of the instrument is a "frequency control," operated by means of a single screw on the back of the microphone unit. As far as could be determined, the effect of turning this screw through the whole range from the extreme counter-clockwise to the extreme clockwise position was to lower the gain produced over the frequency range up to 1,024 cycles inclusive and to increase the gain by about 4 decibels at 4,096 cycles. Using audiometric tests with a hard of hearing subject, the following gains were shown:



Vacolite Model D
Hearing Aid.

Frequency Control Setting	128	256	512	1,024	2,048	4,096 Cycles
Extreme counterclockwise position	6	12	17	23	27	15 decibels
Extreme clockwise position	-3	-2	-5	+17	+21	+19 decibels

Using pure tones at normal ear threshold with the instrument full on showed gains as follows:

Frequency Control	128—256	512—2,048	4,096
Counterclockwise position	Nil	24—39	13 decibels

ARTICULATION

The usual syllable and sentence lists were used with hard of hearing subjects at a distance of 5 feet in a quiet room and showed satisfactory results.

The Council voted to accept the Vacolite Model D Hearing Aid for inclusion on its list of accepted devices.

Council on Pharmacy and Chemistry

REPORT OF THE COUNCIL

THE COUNCIL HAS AUTHORIZED THE FOLLOWING REPORT FOR PUBLICATION.
AUSTIN E. SMITH, M.D., Acting Secretary.

BISMUTH ETHYLCAMPHORATE

(The Upjohn Company)

A preliminary report on Bismuth Ethylcamphorate, The Upjohn Company, was published by the Council in 1930.¹ This compound was stated to be a liposoluble bismuth salt of ethyl camphoric acid which the firm proposed for intramuscular injection to obtain the systemic effects of bismuth in the treatment of syphilis. The proposed adult dose was 1 cc. for a course of twelve injections. Each cubic centimeter contains 40 mg. of elemental bismuth, 0.10 Gm. of camphor and 0.025 cc. of benzyl alcohol dissolved in sweet almond oil. Because the Council considered the evidence at that time to be insufficient to allow proper evaluation of the drug, it voted to postpone consideration until further data became available and to publish a preliminary report.

Since the date of that report the Council has received communications from the Upjohn Company presenting more clinical data. In 1940 the firm forwarded the results of investigations by Drs. Thurman and Benotti (from the Clinic of Dermatology and Syphilology of the Boston Dispensary and the Chemistry Laboratory of the Joseph H. Pratt Diagnostic Hospital, units of the New England Medical Center and Department of Medicine, Tufts College Medical School, Boston) relating to the urinary excretion of elementary bismuth in the urine of patients treated with Bismuth Ethylcamphorate. After considering the protocols, the referee pointed out that with a single intramuscular injection of 40 mg. (1 cc.) of Bismuth Ethylcamphorate the average daily excretion for the first week was 0.88 mg., the second week 0.63 mg. and the third week 0.92 mg.; with a single injection of 80 mg. (2 cc.) the average daily excretion for the first week was 1.79 mg., the second week 1.32 mg. and the third week 0.45 mg. When 40 mg. (1 cc.) was administered for three injections at seven day intervals, the average daily excretion in 3 patients for the first week was 1.23 mg., 1.73 mg. and 1.8 mg. respectively. During the second week the average excretion was 1.73 mg., 1.74 mg. and 3.15 mg. respectively; and for the third week, it was 2.21 mg., 1.66 mg. and 3.72 mg. When 80 mg. (2 cc.) of the compound was injected once weekly for three weeks, the average daily bismuth excretion in the 3 patients was 1.7 mg., 1.84 mg. and 2.23 mg. for the first week; 3.04 mg., 2.31 mg. and 3.5 mg. for the second week; 3.9 mg., 1.47 mg. and 3.4 mg. in the third week. The evidence indicated that 2 cc. must be injected at least every five to seven days in order to maintain a daily urinary excretion of 2 mg. of metallic bismuth, the level which the Council recognizes as indicating therapeutic antisyphilitic potentialities for a parent bismuth compound. The Council considered the submitted evidence and voted that sufficient evidence had not yet been presented, especially in relation to the rate of disappearance of the organisms and healing of lesions.

In May 1941 the Council office received a communication from the firm enclosing protocols of the treatment of 17 cases of early syphilis by Dr. M. L. Barnes of the University of Louisville, representing a study of the disappearance of spirochetes and healing of lesions after the use of Bismuth Ethylcamphorate; protocols of 26 cases of early syphilis treated at the Dallas Syphilis and Venereal Disease Clinic by Dr. L. J. Alexander; and a tabulation summarizing the data now available concerning

time of disappearance of organisms and healing of lesions in all cases of early syphilis treated with 1 cc. and 2 cc. doses of Bismuth Ethylcamphorate at varying intervals. As one would expect from the excretion studies, the spirochetes disappeared more rapidly when injections of 2 cc. were used than when 1 cc. was employed. The time required for the disappearance of the organisms varied with the dose, the limits being one to fourteen days, with an average of six days for the entire group. With the use of Bismuth Ethylcamphorate, primary lesions were found to have healed satisfactorily usually in from one to two weeks, and secondary and tertiary lesions likewise to respond in a favorable manner.

During the early investigations, doses of 1 cc. appeared to be better tolerated than 2 cc., but later it was found that doses of 2 cc. were satisfactorily tolerated. When injected intramuscularly, the compound is comparatively painless.

After considering all the available evidence the Council voted to recognize Bismuth Ethylcamphorate, The Upjohn Company, as a satisfactory bismuth compound for the treatment of syphilis when used in amounts of 30 mg. (2 cc.) injected intramuscularly every five to seven days and when used where a bismuth compound is indicated in such therapy.

NEW AND NONOFFICIAL REMEDIES

THE FOLLOWING ADDITIONAL ARTICLES HAVE BEEN ACCEPTED AS CONFORMING TO THE RULES OF THE COUNCIL ON PHARMACY AND CHEMISTRY OF THE AMERICAN MEDICAL ASSOCIATION FOR ADMISSION TO NEW AND NONOFFICIAL REMEDIES. A COPY OF THE RULES ON WHICH THE COUNCIL BASES ITS ACTION WILL BE SENT ON APPLICATION.

AUSTIN E. SMITH, M.D., Acting Secretary.

ZINC PEROXIDE MEDICINAL.—A mixture consisting essentially of zinc peroxide, ZnO_2 , with varying amounts of zinc oxide, ZnO , and zinc hydroxide, Zn(OH)_2 . The zinc peroxide content is not less than 45.5 per cent, equivalent to not less than 7.5 per cent of available oxygen.

Actions and Uses.—See general article, Metallic Peroxides. (New and Nonofficial Remedies, 1941, p. 385.)

Dosage.—Zinc peroxide medicinal (powder) sterilized in small quantities (10 to 50 Gm.) by heating in a dry oven for four hours at exactly 140 C. is made up with sterile distilled water to a smooth, creamy suspension of about the consistency of heavy (40 per cent) cream. The dose depends entirely on the size of the wound to be treated. Enough of the creamy suspension should be used to provide the surface of the wound with a layer approximately $\frac{1}{8}$ inch thick. If the suspension is too thin it runs off. If it is too thick it may not come in contact with all surfaces in the crevices of the wound. The suspension should be a cream and not a paste. The first layer, applied readily with a syringe, is then covered over with a thin layer of cotton soaked in the suspension and this in turn covered with a thick layer of cotton wet with water and then sealed with an impermeable covering or coating of some kind. Dressings are usually changed in twenty-four hours but may be left for several days.

Zinc peroxide medicinal occurs as a fine, white, odorless, crystalline powder. It is insoluble in water but forms a smooth paste which does not cake or harden. A 5 per cent aqueous suspension of zinc peroxide medicinal separates to yield a clear supernatant liquid in thirty minutes, and bubbles of oxygen appear from the sediment.

Suspend 0.2 Gm. of zinc peroxide medicinal in 10 cc. of water, add diluted hydrochloric acid dropwise until the bulk of the solid is dissolved and then add 1 cc. of sodium acetate solution. Filter the mixture and divide the filtrate into two portions. Boil one portion to remove peroxides and finally cool; the solution responds to tests for zinc. Acidify the other portion with 1 cc. of diluted sulfuric acid; the solution responds to tests for peroxides.

Transfer approximately 3 Gm. of zinc peroxide medicinal to a beaker containing 50 cc. of distilled water, add 20 cc. of diluted nitric acid and dilute to about 100 cc. with distilled water. Add 25 cc. of tenth-normal silver nitrate, digest on the steam bath, filter and wash the precipitate with distilled water. Combine the filtrate and washings and titrate the mixture with tenth-normal potassium thiocyanate to a faint brown color, using 3 cc. of ferric ammonium sulfate solution as the indicator. Prepare and titrate a blank control; the difference between the volumes of thiocyanate solution observed in the two titrations is equivalent to a chloride content not greater than 1 per cent.

Transfer approximately 0.3 Gm. of zinc peroxide medicinal, accurately weighed, to a 250 cc. Erlenmeyer flask containing 50 cc. of diluted sulfuric acid. Shake the mixture until the powder dissolves and titrate the solution to a faint, permanent, pink color with tenth-normal potassium permanganate. The zinc peroxide content is not less than 45.5 per cent and the available oxygen content not less than 7.5 per cent (1 cc. of tenth-normal potassium permanganate is equivalent to 4.869 mg. of zinc peroxide, ZnO_2 , or 0.8 mg. of available oxygen).

Heat about 100 Gm. of zinc peroxide medicinal in a 250 cc. cotton plugged Erlenmeyer flask in an oven at 135-140 C. for four hours.

Cool the flask and contents to room temperature, mix the material well by shaking, allow to stand at least ten hours, mix again and use this heat-treated material for the following tests:

Transfer 5 Gm. of the heat-treated material to a beaker, add 100 cc. of distilled water and shake thoroughly. After allowing the mixture to stand for fifteen minutes, determine the pH at 25 C. by means of a glass electrode. The pH is not less than 7.0 nor more than 8.5.

Transfer approximately 5 Gm. of the heat-treated material, accurately weighed, to a 250 cc. Erlenmeyer flask, add 100 cc. of distilled water at 37.5 C. and mix thoroughly. Submerge the flask and contents in a constant temperature water bath at 37.5 C. for two hours and finally filter through a fritted glass funnel. Wash the residue with 5 cc. of distilled water; acidify the combined filtrate and washings with 20 cc. of diluted sulfuric acid and titrate to a faint, permanent, pink color with tenth-normal potassium permanganate; the active oxygen content is not less than 0.01 per cent (soluble peroxides).

Transfer 5 Gm. of the heat-treated material to a dry 125 cc. Erlenmeyer flask, add 25 cc. of distilled water at 37.5 C. and mix well. Fill the flask with distilled water at 37.5 C., shake thoroughly and immediately insert a stopper equipped with a lead-over tube. The lead-over tube should extend to within 1 cm. of the bottom of the flask and, when inserted, should be filled with liquid. Submerge the flask and contents in a constant temperature water bath at 37.5 C. and place a 25 cc. burette which has been filled to the lowest calibration mark with distilled water, beneath the end of the lead-over tube. Measure the volume of liquid displaced after twenty-four hours: the volume of liquid displaced is not less than 12 cc.

MERCK & CO., INC., RAHWAY, N. J.

Zinc Peroxide-Special Medicinal (powder): 1 ounce, $\frac{1}{4}$ pound, and 1 pound bottles.

MALLINCKRODT CHEMICAL WORKS, ST. LOUIS.

Zinc Peroxide 45% ZnO_2 Medicinal (powder): $\frac{1}{4}$ pound bottle.

OVARIES (See New and Nonofficial Remedies, 1941, p. 372).

The following preparations have been accepted:

THE LAKESIDE LABORATORIES, INC., MILWAUKEE.

Tablets of Estrogens: 1000 I. U., 2000 I. U., and 4000 I. U.

Ampule Solution of Estrogens (in oil): 1 cc. Each cubic centimeter contains the equivalent of 2,000 international units of estrone and 0.5 per cent chlorobutanol as a preservative in sesame oil.

Solution of Estrogens (in oil): 25 cc. rubber stoppered vials. Each cubic centimeter contains the equivalent of 2,000 international units of estrone and 0.5 per cent of chlorobutanol as a preservative in sesame oil.

Ampule Solution of Estrogens (in oil): 1 cc. Each cubic centimeter contains the equivalent of 5,000 international units of estrone and 0.5 per cent of chlorobutanol as a preservative in sesame oil.

Solution of Estrogens (in oil): 15 cc. rubber stoppered vials. Each cubic centimeter contains the equivalent of 5,000 international units of estrone and 0.5 per cent of chlorobutanol as a preservative in sesame oil.

Ampule Solution of Estrogens (in oil): 1 cc. Each cubic centimeter contains the equivalent of 10,000 international units of estrone and 0.5 per cent of chlorobutanol as a preservative in sesame oil.

Solution of Estrogens (in oil): 15 cc. rubber stoppered vials. Each cubic centimeter contains the equivalent of 10,000 international units of estrone and 0.5 per cent of chlorobutanol as a preservative in sesame oil.

ALUMINUM HYDROXIDE GEL (See THE JOURNAL, Nov. 1, 1941, p. 1539).

The following preparation has been accepted:

MACALLISTER LABORATORY, CLEVELAND.

Aluminum Hydroxide Gel: one pint and one gallon bottles. Contains 4.6 per cent aluminum hydroxide (equivalent to 3.0 per cent aluminum oxide) with saccharin-U. S. P. and oil of peppermint-U. S. P. as flavoring agents.

BISMUTH SUBSALICYLATE (See New and Nonofficial Remedies, 1941, p. 155).

GEORGE A. BREON & COMPANY, INC., KANSAS CITY, MO.

Bismuth Subsalsicylate in Oil Suspension with 3% Chlorobutanol: 30 and 60 cc. rubber-capped vials. Each cubic centimeter contains 0.13 Gm. (2 grains) of bismuth subsalsicylate-U. S. P., equivalent to 72 mg. of bismuth metal suspended in peanut oil, and 0.03 Gm. (3%) of chlorobutanol.

THE JOURNAL OF THE AMERICAN MEDICAL ASSOCIATION

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SATURDAY, MARCH 14, 1942

BLAST INJURIES

Fulton¹ has recently called attention to the fact that nothing has been done toward investigating blast, although this country has for two years been aware of the bombing of cities and shelling of ships on the high seas. Research on the subject of injuries due to blast is limited to the basic studies of Hooker² in this country and to the more recent work of Zuckerman³ in England. A subsidy from the Committee on Shock of the National Research Council made possible a study to be carried on during 1918-1919 at the Sandy Hook Proving Ground. There Hooker studied the effect on frogs, cats and dogs placed at varying distances from the muzzle of 10 inch and 12 inch guns and also from trinitrotoluene detonations. These studies led him to emphasize four points: The fatal effects of primary blasts occur in animals only relatively near the explosion, a difference of 2 or 3 feet often determining the question of life or death; there is a syndrome of primary shock characterized by collapse of the blood pressure in animals affected but not killed; there is an absence of petechial hemorrhages or other intracranial lesions in the brains of animals exhibiting primary shock; hemorrhagic lesions of the lungs and occasionally of other visceral organs are prevalent in animals subject to blast. The extent of the lung lesion bore little if any relation to the gravity of the symptoms of concussion. Hooker regarded the condition of circulatory collapse following violent air concussion as indistinguishable from the circulatory collapse from primary shock that follows traumatic concussion in civil life.

In his report on experimental investigation carried out for the Research and Experiments Department of the Ministry of Home Security, Zuckerman detailed his studies on mice, rats, guinea pigs, rabbits, cats, monkeys and pigeons. These were exposed to charges of 70 pounds of high explosives and from the explosion of hydrogen and oxygen in balloons. Animals were

never killed at distances farther than 18 feet, and none were ever hurt at distances farther than 50 feet from the explosion. Almost all animals were killed between 13 feet and 18 feet, distances at which the positive component of the blast wave varied between 126 and 63 pounds per square inch. In no animal was there any external sign of injury. The principal lesion was bilateral traumatic hemorrhage in both lungs, varying in degree according to the distances of the animals from the charge and the pressure to which the animals were subjected. The lesions of the lung frequently follow the lines of the ribs; when lacerations occur they are in line with the ribs; a site of election of the lesions is those parts which fit into the costomediastinal and costophrenic sinuses. Animals whose bodies were clothed in thick layers of rubber suffered little or no damage. Zuckerman concluded from these experiments that it is the pressure component of the blast wave which bruises the lungs by its impact on the body wall.

In the case of a bomb explosion Zuckerman points out that a man may be wounded by being hit by fragments of bomb casing or by masonry, by being violently thrown or by being affected by the blast wave without being thrown. If a man close to a bomb explosion is fortunate enough to miss a flying missile, he cannot escape being affected by the blast unless he is sheltered close behind some substantial structure from which the wave will be deflected. The clinical reports on primary blast injury emanating from England are scarce and suggest that deaths due to this cause are not common. Dean, Thomas and Allison⁴ report a series of 27 cases under treatment for burns and other injuries resulting from the bursting of high explosive bombs at close quarters. They emphasize the frequency of a "blown up" or ballooned appearance of the chest, especially at the lower costal margins, after such injuries. This appearance was often associated with diminished movements of the diaphragm. O'Reilly and Gloyne⁵ report 17 cases of blast injury to the lungs without external injury. The main symptoms were grave shock, prostration and restlessness, respiratory difficulty and pain in the chest. The principal physical signs were bulging of the chest wall, congestion and consolidation of the lungs. Bronchopneumonia was a common sequel. In cases which came to necropsy these authors found gross effusion of blood into the mediastinum due to rupture of the capillaries. On gross examination the lungs exhibited patches of intensive congestion resembling early lobar pneumonia. Microscopic examination revealed extensive outpouring of erythrocytes, rupture of elastic tissue and capillaries and secondary infection with streptococci causing bronchopneumonia. Robb-Smith⁶ calls attention to the fact that pulmonary symptoms which arise from exposure to the blast of

1. Fulton, J. F.: Blast and Concussion in the Present War, New England J. Med. 226:1 (Jan. 1) 1942.

2. Hooker, D. R.: Physiological Effects of Air Concussion, Am. J. Physiol. 67:219 (Jan.) 1924.

3. Zuckerman, Selly: Experimental Study of Blast Injuries to the Lungs, Lancet 2:219 (Aug. 24) 1940.

4. Dean, D. M.; Thomas, A. R., and Allison, R. S.: Effects of High Explosive Blast on the Lungs, Lancet 2:224 (Aug. 24) 1940.

5. O'Reilly, J. N., and Gloyne, S. R.: Blast Injury of the Lungs, Lancet 2:423 (Oct. 11) 1941.

6. Robb-Smith, A. H. T.: Pulmonary Fat Embolism, Lancet 1:122 (Feb. 1) 1941.

high explosives may be due to a combination of pulmonary concussion and fat embolism. Of 789 consecutive accident cases reported by him, 125 were fatal; of these 41 presented gross pulmonary fat embolism and in 29 it was thought to have played a major part in causing death. Of the fatal cases, 12 showed no bony injury. O'Reilly and Gloyne did not see any evidence of fat embolism in their cases. Injury to the central nervous system, though limited to minor changes in the brain tissue and occasional areas of subpial hemorrhage, is evidently capable of causing a profound concussion which is quite probably of the same nature as a traumatic concussion.

AMINO ACID METABOLISM IN THE ISCHEMIC KIDNEY

A study of the amino acid metabolism in the isolated ischemic kidney of laboratory animals has led Bing and Zucker¹ of Columbia University to formulate a new theory of the chemical etiology of renal hypertension. Among the numerous metabolic enzymes known to be present in the kidney the Columbia University physiologists emphasize the role of two groups of ferments which transform amino acids into simpler end products. First are a number of specialized catalysts acting directly on amino acids, taking from each its carboxyl group. These decarboxylases thus transform amino acids into corresponding amines. The action of these specialized decarboxylating enzymes is readily demonstrated in aqueous extracts of the renal cortex. The resulting amines may be isolated chemically or titrated by means of their pressor effects on cats. While most amino acids are without appreciable effects on arterial blood pressure, many of the corresponding amines cause arterial hypertension often equal to that produced by equivalent doses of epinephrine.

The essential point in this decarboxylation is the fact that these pressor amines are demonstrable only when enzymic action takes place under anaerobic conditions.² In the presence of oxygen the initial pressor amines are apparently destroyed by the subsequent action of a second group of catalysts, reducing them to pharmacologically inert end products.

If one was to assume that in the ischemic kidney the oxygen tension is below that necessary for this terminal destruction or deamination, local amino acid metabolism would be arrested in such kidneys after the initial decarboxylation. The resulting initial or intermediary pressor amines might well be the dominant factor in producing the observed arterial hypertension.

Bing and Zucker tested this possibility by injecting a typical amino acid, *L*-"dopa" (*L*-dihydroxyphenylalanine) into the kidney parenchymas of cats. In their preliminary tests a clamp was placed about the renal pedicle, completely stopping the kidney circulation.

Ringer's solution containing 10 mg. of dopa was then injected through the renal capsule. Two and a half hours later the clamp was removed, restoring the kidney circulation. In all cases this removal was followed within two minutes by a marked rise in arterial blood pressure, the average rise being 68 mm. or mercury, with 115 mm. as the maximum. Previous release of a control clamp on the opposite uninjected kidney had invariably given no appreciable change in arterial blood pressure. Within two and a half hours, therefore, the totally ischemic kidney is able to convert an effective amount of the injected dopa into the corresponding dopa-amine (presumably hydroxytyramine).

In a second series of tests the same dose of amino acid was injected into the parenchymas of kidneys with normal circulation. Except in the few cases in which there was an evident traumatic vasoconstriction, pressor effects were not recorded. With the unimpaired renal circulation, therefore, pressor amines are either not formed or, if formed, are completely destroyed by deamination.

In a third series of tests the same amino acid dose was injected into a series of 40 kidneys in which the renal circulation had been reduced one half by the application of the Goldblatt³ clamp. In a typical test of this series the arterial blood pressure rose 75 mg. within sixteen minutes. Intermediary pressor amines, therefore, are formed in effective quantities and are not subsequently destroyed in the 50 per cent ischemic cat kidney.

Finally, perfusion of totally ischemic cat kidneys two and a half hours after dopa injection yielded perfusates whose pressor effects were not destroyed by heating to 100 C. for three minutes or by ultrafiltration (cellophane membrane). These properties differentiate the Holtz² ischemic pressor factor from the protein-like renin⁴ and ischemin⁵ emphasized by previous investigators. By prolonging the total ischemia four to six hours, however, the Columbia physiologists demonstrated the formation or release of such pressor proteins in uninjected kidneys. Evidently the production of pressor amines precedes the formation or liberation of previously emphasized colloidal hypertensins.

The observation of Mason and his collaborators⁶ that ammonia production is reduced in the ischemic kidney tends to confirm the suggested theory of arrested aerobic deamination. Schroeder's⁷ demonstration that tyrosinase reduces the hypertension in both animals and man is also confirmatory. Tyrosinase is known to destroy many phenolic compounds resembling the hypotensive initial dopa-amine (hydroxytyramine).

3. Goldblatt, Harry; Lurch, J.; Hanzal, R. F., and Summerville, W. W.: *J. Exper. Med.* 59: 347 (Sept.) 1934.

4. Page, S. H., and Helmer, O. M.: *J. Exper. Med.* 71: 29 (Jan) 1940.

5. Prinzmetal, Myron; Lewis, H. A., and Leo, S. D.: *Proc. Soc. Exper. Biol. and Med.* 43: 696 (April) 1940; *J. Exper. Med.* 72: 763 (Dec.) 1940.

6. Mason, M. F.; Robinson, C. S., and Blalock, Alfred: *J. Exper. Med.* 72: 289 (Sept.) 1940.

7. Schroeder, H. A., and Adams, M. H.: *J. Exper. Med.* 73: 531 (April) 1941.

1. Bing, R. J., and Zucker, M. B.: *J. Exper. Med.* 74: 235 (Sept.) 1941.

2. Holtz, P., and Heise, R.: *Arch. f. exper. Path. u. Pharmacol.* 191: 87, 1939.

Current Comment

MEDICAL-PHARMACEUTICAL CONFERENCE

By arrangement of the Board of Trustees of the American Medical Association, a joint committee from the American Medical Association met recently with a similar committee from the American Pharmaceutical Association to arrange a medical-pharmaceutical conference in association with a special meeting of the United States Pharmacopeial convention, which is to take place in Cleveland on April 7 to consider the proposed constitution and by-laws. The Medical-Pharmaceutical Conference will be held in the Statler Hotel, Cleveland, April 6, 1942. The program follows:

2 p. m. DEAN TORALD SOLLMANN presiding.

1. Evolution of the Apothecary. E. B. KRUMBHAAR, RALPH MAJOR or HOWARD DIETRICK.
2. Trends of Pharmaceutical Practice. E. F. KELLY.
3. Is the Program of Pharmaceutical Education Justified? ROBERT C. WILSON.

Open discussion limited to two minutes. Each contributor may speak but once.

6:30 p. m. Dinner. DEAN B. V. CHRISTENSEN presiding.

Address: Status of Medicine and Pharmacy in the War and After.

Discussion by representatives of the Army and the Navy.

It is hoped that all those who attend the United States Pharmacopeial convention will be able to come to Cleveland on the day previous so as to participate in this meeting. Unquestionably it is one of great significance for the advancement of professional relationships between medicine and pharmacy.

DR. WEISKOTTEN APPOINTED SECRETARY OF COUNCIL ON MEDICAL EDUCATION AND HOSPITALS

The Board of Trustees of the American Medical Association has appointed Dr. Herman Gates Weiskotten secretary of the Council on Medical Education and Hospitals to succeed the late Dr. William Dick Cutter. Dr. Weiskotten was born in Syracuse, N. Y., in 1884 and graduated from Syracuse University College of Medicine in 1909. Following an internship in the Hospital of the Good Shepherd in Syracuse he was instructor in pathology and bacteriology in his alma mater, 1910-1912, then assistant professor of pathology, 1912-1913, and later associate professor, 1913-1917. Since 1917 he has been professor and head of the department of pathology. From 1922 to 1925 he was acting dean of Syracuse University College of Medicine and since 1925 has been dean and director of the University Hospitals. From 1926 to 1928 he was also commissioner of health of the city of Syracuse. He is a member of the New York State Public Health Council and a member of the American Association of Pathologists and Bacteriologists. A few years ago Dr. Weiskotten collaborated with the late Dr. Cutter in a personal inspection and survey of the medical colleges of the United States and Canada.

OUTLINE OF PROCEDURE FOR PHYSICIANS IN INDUSTRY

Elsewhere in this issue is reproduced a series of recommendations prepared by the Council on Industrial Health and approved by the Judicial Council, intended to help physicians who serve in industry. The outline describes the objectives of industrial health, the functions of physicians in industry and the new relationships which represent the altered professional problems encountered in medical supervision over employed groups. This statement clearly implies that medical service in industry can operate efficiently, ethically and scientifically for the best interests of the worker, the employer, official agencies, the medical profession and the community. The industrial physician has obligations to the medical profession at large; the private practitioner is obligated to recognize professional competence in supervising the care of work forces. Exploitation of the industrial disability of the patient by unnecessarily delaying his return to work is just as reprehensible as the use of industrial influence to enhance individual practice. With this guide a physician in community practice should facilitate expansion of his services to meet the requirements of small and medium sized plants for preventive medicine, surgery and hygiene. In such establishments the application of professional skill and interest is much needed.

MORALE

An excellent project is the development of a series of radio talks on morale by a special subcommittee of the New York Academy of Medicine. This committee, which includes a number of distinguished experts in the fields of public health and psychiatry, points out that it proposes to treat the subject of morale from the constructive, positive, rather than from the negative, aspect. Little emphasis will be placed on fears, anxieties and the destructive aspects of war. Instead, much attention will be devoted to activities in which people may engage in a motor sense, leading to sustaining the emotional equilibrium and developing competence to meet emergencies. Among the specific concepts which will form the basis of the proposed radio talks are the following:

1. Mental casualties result not so much from the threat of bodily harm as from disruption of the normal living processes.
2. The best antidote to panic is to engage the energies of people in communal and gregarious activities.
3. Those who express their anxieties in motor reactions can find release in activities of a social character.
4. Children tend to reflect the anxieties of their parents. The awareness of this by the parents will help them better to protect their children.
5. To children under 6 years of age the home is the center of their emotional life, while, to children under 11, school is the emotional pivot.
6. Food and warmth are all important in sustaining morale.

Significantly the musical theme selected for this series is "Keep the Home Fires Burning." Did the committee give any consideration to the choice of the word "burning" as a subject for thought when bombs are falling?

MEDICINE AND THE WAR

In this section of The Journal each week will appear official notices by the Committee on Medical Preparedness of the American Medical Association, announcements by the Surgeon Generals of the Army, Navy and Public Health Service, and other governmental agencies dealing with medicine and the war, and such other information and announcements as will be useful to the medical profession.

PROCUREMENT AND ASSIGNMENT SERVICE FOR PHYSICIANS, DENTISTS AND VETERINARIANS

The final steps in the printing and mailing of the enrolment form and questionnaire for physicians, dentists and veterinarians, described in the special article on the Procurement and Assignment Service which was published in the February 21 issue of THE JOURNAL, are now being completed. In the meantime the questionnaires originally published in THE JOURNAL OF THE AMERICAN MEDICAL ASSOCIATION and in the various state medical journals have served to provide the United States Army and Navy medical departments with additional names of physicians, mostly under 36 years of age, who stated that they were available for immediate service. The continuous development of the Army and Navy medical departments means that additional names will have to become available, in considerable numbers, daily for some months to come. Following the completion of internships for the current year there will become immediately available to both the Army and the Navy medical departments a considerable number, perhaps as many as 60 per cent, of those who are now completing their hospital training. Especially important is the statement from the Army Medical Department that commissions for limited service will be granted to physicians with physical disabilities, who may serve in the zone of the interior. Those who receive such limited service

commissions will, of course, be accepted with waivers of disabilities.

Every physician who receives the enrolment form and questionnaire should return it immediately in the franked envelop which will be enclosed. He will have opportunity to indicate a preference for various types of service. Once he has enrolled, he will receive a certificate indicating his enrolment for war service and will be privileged to wear the official button of the Procurement and Assignment Service.

In times like these the demands on rapidly expanding federal agencies are tremendous. The difficulties in securing a sufficient amount of competent stenographers and typists and of needed office material and of space have complicated greatly the problem of maintaining correspondence in the office of the Procurement and Assignment Service. It is hoped that physicians will be patient in awaiting replies to letters discussing their individual problems, realizing that the primary task at the present moment is to maintain for the Army and Navy medical departments adequate lists of men on whom they may call immediately. No doubt, as the work of the office becomes stabilized the promptness of reply to correspondence will be facilitated.

THE NEED FOR TRAINED MEDICAL PERSONNEL TO CARE FOR THE HEALTH OF THE MILITARY

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One of the important tasks of the Army Medical Department is the procurement of all trained medical personnel necessary to care for the health of the military. I propose not to discuss problems of procurement but, rather, to focus attention on Army medical installations which require trained personnel.

Mere mention of the more important fixed military medical establishments and the citation of how additional personnel are utilized with tactical units to furnish field medical service should make it clear that many individuals trained in medicine and allied sciences are vital if the Medical Department's objective is to be attained. This mission is the preservation of the strength of the Army by conservation of military manpower (1) by the selection, through properly conducted physical examinations, of only those men physically fit for military service, (2) by keeping such personnel in good physical condition, through application of modern principles of preventive medicine, and (3) by furnishing those who do become disabled with such aid in the form of evacuation and hospitalization facilities as will speedily restore them to health and fighting efficiency.

To assure maximum coordination and teamwork with all branches of the Army, it is necessary that medical service to the military be rendered by personnel who are a part of the military team and completely under Army control. The various groups of military medical personnel which collectively comprise the Medical Department are under the direction of Major General James C. Magee, the Surgeon General of the Army.

Caring for the health of the military is a far more complex undertaking than meets the eye. It cannot be accomplished by existing civilian medical agencies or by arbitrarily applying principles which have proved most satisfactory in civilian medical organization and practice.

In the armed forces, subordination to military control is of prime importance. At times this may require patient forbearance and suppression of individualistic action. Physicians are apt to find difficulty in adapting themselves to the standardization and regimentation which are designed to accomplish the greatest good for the greatest number, especially if they are unable to visualize the necessity for such adaptation.

Therefore, as I outline the manner in which trained medical personnel are utilized to care for the health of

our army, we should bear in mind the foregoing considerations and the restrictions that military necessity will impose.

The Army Medical Department is made up of a number of professional groups as well as a large complement of enlisted personnel and civilian employees. The professional groups include the Medical, Dental, Veterinary, Medical Administrative, Sanitary and Nurse corps. All members of these groups hold rank as officers, the nurses being given the "relative" rank of officers. The Medical Department is allocated enlisted personnel for fixed Medical Department establishments in the proportion of 4.85 per cent of the total enlisted strength of the Army. Further allocations of men to the Medical Department for assignment with tactical units vary with the tables of organization and activation of such units. It is safe to estimate that in time of war approximately 7.5 per cent of the total enlisted strength of the Army will belong to the Medical Department. During a major battle, such as the Meuse-Argonne in the first world war, more than 25 per cent of the field force, including patients and medical personnel, may be under direct control of the medical service.

It seems appropriate here to mention briefly the more important Army medical establishments and their functions and to indicate the various types of trained medical personnel which are needed.

MILITARY HOSPITALS

The physician entering military service from civilian life will have to make less of an adjustment to his Army duties if he is assigned to a fixed hospital than if ordered into the field with a tactical unit. But even in the large military hospitals he will encounter unfamiliar administrative procedures.

Army hospitals are classed either as "fixed" or as "mobile." The "fixed" hospitals may be of permanent or temporary construction. They usually remain at the same site for the duration of the war and for an indefinite period thereafter. The "mobile" hospitals are intended primarily for use with field forces in combat zones of theaters of military operations.

Fixed hospitals are classed as either "general" or "station" hospitals. The former vary in size from approximately five hundred to two thousand beds, while the latter vary from twenty-five up to two thousand beds. It is contemplated that general hospitals be maintained to care for about 1 per cent of our total military population, while station hospitals are able to accommodate 4 per cent of the Army. These fixed hospitals are adequately equipped to meet the ordinary requirements of trained medical staffs.

The need for suitably trained medical personnel to operate the Army's fixed hospitals is obvious, and their duties do not differ essentially from the work of similar personnel in civilian hospitals of comparable size. It should be borne in mind, however, that the Army medical officer will deal with a different group of patients than is ordinarily encountered in civilian hospital practice. The illnesses and injuries which the Army doctor is most likely to encounter will occur largely among a class of young men who were physically fit when selected for military service. Therefore infectious diseases will be more prevalent than degenerative maladies, and acute ailments will predominate over chronic disabilities. Furthermore, persons with minor illnesses, who would ordinarily be treated at home in civil life

must, in the Army, be hospitalized, as it is impracticable for sick soldiers to remain in barracks.

Military hospitals, with few exceptions, are not provided with interns. The work normally expected of interns must be done by medical officers, who thus are not only afforded an opportunity to study cases in detail but are required to assume full responsibility for their patients.

A one thousand bed Army general hospital, according to proposed tables of organization, requires for its proper functioning a quota of fifty-six officers, one warrant officer, one hundred and five nurses and five hundred enlisted men. The officers include thirty-nine Medical Corps officers (physicians), five Dental officers, seven Medical Administrative Corps officers, two chaplains, two Quartermaster officers and one Sanitary Corps officer. These estimates are considerably lower than the figures contained in previous tables of organization, since the danger of seriously depleting the ranks of civilian medical practice is appreciated and has been given careful consideration.

Among the enlisted men allocated to military hospitals for duty, technicians trained in the following fields are necessary: (1) sanitation, (2) x-ray, (3) pharmacy, (4) laboratory, (5) veterinary, (6) dental, (7) medical and (8) surgical. Anticipating the need for technicians, the Army Medical Department kept pace with the military expansion program for Selective Service training prior to our entry in the war. For many months courses have been conducted at our larger military hospitals and at Carlisle Barracks to train enlisted technicians. These men were coming off of the "assembly lines" at the rate of approximately fifteen hundred a month prior to the Japanese assault on Pearl Harbor.

In addition to enlisted technicians, who must meet the physical standards required for general military service, a number of civilian medical technicians are necessary in our permanent Army hospitals, dispensaries and laboratories.

Thus far I have discussed the need for trained hospital personnel such as are employed ordinarily at large military hospitals. With the numerical requirements of a thousand bed general hospital just cited as an example, it is not difficult to visualize the needs of smaller and of larger "fixed" Army hospitals, which receive allotments of personnel on a scale roughly proportionate to the size of the hospital.

MILITARY DISPENSARIES

Trained medical personnel are also needed to staff our Army dispensaries, which provide outpatient service to military personnel not requiring hospital care. Army dispensaries, like hospitals, are classed as "fixed" or "mobile." Fixed general dispensaries are maintained in some of our larger cities where the size of the military population warrants their establishment. Fixed station dispensaries are provided at many small military stations, where there is no hospital, to provide outpatient service. Station dispensaries are also maintained at very large posts to relieve station hospitals of burdensome outpatient service. On some of the larger military reservations where Army units of considerable size are quartered in scattered areas, decentralized dental clinics, each equipped with fifteen or twenty-five chairs, are set up in populous troop areas, thus obviating many long trips to the station hospital or dispensary. Mobile or

"unit" dispensaries are provided to serve the nonhospital medical needs of troops in the field. In combat these unit dispensaries are known as "aid stations."

OTHER MILITARY ACTIVITIES REQUIRING MEDICAL PERSONNEL

Trained medical personnel are also necessary at the headquarters of the nine corps areas, at the headquarters of our overseas departments and at corps area and department laboratories, as well as in the Office of the Surgeon General of the Army and in the Medical Section of the Office of Chief of Air Corps. They are needed at the Medical Field Service School and at the four Medical Department replacement training centers at Camp Lee, Va., Camp Grant, Ill., Camp Berkeley, Texas, and Camp Robinson, Ark., to train Medical Department enlisted recruits in the medicomilitary aspects of field service. Trained medical men are needed at the Army Medical School, Dental School and Veterinary School. They are needed at the School of Aviation Medicine and at the Aero-Medical Research Laboratory.

The Supply Division of the Surgeon General's Office in Washington, D. C., and the Army medical supply depots which are located in various parts of our country and overseas require officer personnel with a high degree of technical training in medical supply work. It is necessary that many of these officers be selected from among qualified physicians in order that our medical supply problems may be thoroughly understood by the officers charged with the procurement and distribution of this important material. The need for physicians to engage in medical supply work has been adequately met by a special training program for selected officers of the Regular Army Medical Corps, who have been chosen to administer and maintain this service. These "supply trained" medical men form the nucleus of a medical supply organization which also has need for nonmedical specialists in this field.

AVIATION MEDICAL EXAMINERS AND FLIGHT SURGEONS

The Army Air Corps is expanding enormously, so the need for aviation medical examiners and flight surgeons has increased correspondingly. To help meet the requirements, the Army School of Aviation Medicine at Randolph Field, Texas, has been conducting courses to qualify physicians as aviation medical examiners. In normal peacetime these courses lasted four months but, with the need for mass production of pilots incident to military expansion, the courses were shortened to two months. This brief period of time proved inadequate, and the course has been lengthened to three months. At present more than one hundred medical officers are receiving this training every three months. On graduation they are rated as Aviation Medical Examiners and, after a year of satisfactory service as Examiners, they may qualify as Flight Surgeons.

The Army School of Aviation Medicine was born on Jan. 19, 1918, when the Army Central Medical Research Laboratory began functioning at Mineola, Long Island. The first systematic course for flight surgeons, however, was not given until May 1919. The name of the School for Flight Surgeons was changed to the School of Aviation Medicine on Nov. 8, 1922. The first institution of its kind in the world, the Army School of Aviation Medicine has acquired an enviable

record in training flight surgeons and aviation medical examiners, not only for the Army, but for the Navy and for a limited number of medical officers from Latin-American governments. The school was moved several times, but since Oct. 30, 1931 it has been located at Randolph Field, Texas. The Navy established a School of Aviation Medicine about two years ago at Pensacola, Fla.

FIELD MEDICAL SERVICE

To the physician in civil life the need for trained medical personnel to care for the health of the military, which I have thus far outlined, must be readily apparent. But, in addition, large numbers of trained medical personnel, including physicians, dentists, nurses and veterinarians, also are required for other important military medical duties, particularly in the field, and the need for them is not so readily appreciated by those who are unfamiliar with the organization and requirements of military service.

In modern civilian communities the health of the population is cared for by hospitals, practicing physicians and dentists, health departments and numerous permanent sanitary installations. To provide properly for the health of the military, the Army Medical Department utilizes its own military hospitals, dispensaries and laboratories. It practices preventive medicine and engages in large scale activities not only to provide service to the sick and injured but to establish and maintain sanitation in the Army.

Military preventive medicine and sanitation present a problem quite different from normal maintenance of civilian health. Satisfactory solution of the problem requires trained medical personnel to take over the responsibilities incident to the increased disease hazards occasioned by military life in cantonments and camps and during military operations in the field. These hazards are enormously increased by unfavorable climatic conditions and by exigencies of military service which may for a while take precedence over preservation of health.

There is a need for medical and sanitary inspectors. In large military organizations work of this nature is a full time job, often requiring several assistants. In the smaller units an officer may serve as medical inspector in addition to other Medical Department duties to which he is assigned. He may have had no previous experience at this work, but any physician with satisfactory basic medical education may become an able inspector.

It should be emphasized that, although "fixed" hospitals must be maintained to provide definite treatment for all military personnel requiring such attention, additional military hospital facilities also must be held in readiness and established when necessary to care for the sick and injured soldiers in the combat zone where "fixed" hospitals are not available.

The provision of mobile evacuation hospitals and surgical hospitals to accompany armies in the field, therefore, requires an additional set of medical personnel to staff these hospitals. Since definitive treatment is usually not practicable in these combat zone "mobile" hospitals, beds must be held available also in "fixed" hospitals in the Communications zone of the theater of military operations and in the zone of interior for casualties evacuated from the mobile hospitals in the combat zone.

The mobile evacuation and surgical hospitals receive sick and wounded from the field army areas in which they are temporarily established and from the division medical installations farther forward. The division casualties are concentrated at clearing stations (formerly called field hospitals) by division collecting companies, which receive patients from regimental and battalion aid stations. All the numerous field medical installations require medical personnel in sufficient numbers to meet the needs of large, small and often widely dispersed tactical units.

When one visualizes the scheme of field medical service, including the chain of evacuation of casualties by the Medical Department from front to rear, and considers the magnitude of this important task of the Medical Department, the need for trained personnel is indeed apparent. Every field unit the size of a battalion or larger must have its complement of medical personnel in sufficient numbers to care for the daily increment of sick and to meet satisfactorily the requirements of at least average battle casualty expectancy. Furthermore, these personnel must be supplemented by additional surgical teams and by replacements when necessary. Experience has shown that medical personnel are by no means immune to illness or to enemy weapons.

NEED FOR ADAPTABLE YOUNG PHYSICIANS

Contrary to the expectations of many professional men who come into military service, the greatest need, numerically, is not for surgeons but for physicians to care for the sick, to conduct countless physical examinations and medical inspections, to supervise sanitation, to give technical advice and to serve in whatever capacity they may be needed, whether or not it is in their special field of training. Sooner or later, as the requirements of the service permit, misplaced round pegs may find their way into round holes, and square pegs, we hope, will be guided into square holes. Qualified surgeons, of course, are needed, including specialists in the various sub-branches of surgery, particularly orthopedists. There is a brisk demand for young neuropsychiatrists, roentgenologists, urologists and physicians trained in laboratory medicine.

In time of war the accent is on youth. There is need for intelligent young medical men who are flexible and adaptable to change. Field medical service calls not only for skill but for stamina and strength. Intervals of comparative idleness will be interrupted by dynamic periods of tremendous activity in which speed, resilience and herculean endurance will be demanded of trained medical personnel serving in the combat zone.

To meet properly the obligation of caring for the health of the military, the Army Medical Department needs the following professional men for every thousand men in the Army: (1) six and five-tenths physicians, (2) one and five-tenths dentists and (3) seventy-five one-hundredths veterinarian.

One hundred and twenty nurses are allocated for every thousand fixed hospital beds, but nurses are not actually assigned to fixed hospitals in that proportion. Nurses for overhead, dispensaries and mobile hospitals must be drawn from this allocation figure.

Officers of the Medical Administrative Corps of the Regular Army are selected from qualified graduates of four year courses in pharmacy. They must pass a satisfactory professional examination prior to commission. Medical Administrative Corps Reserve officers

at present are appointed only from among enlisted men who have satisfactorily completed a course of instruction at the Medical Administrative Officers' Candidate School at Carlisle Barracks, Pa.

SPECIALISTS IN ALLIED MEDICAL FIELD COM- PRISE SANITARY CORPS

The Army Medical Department also must have specialists who are not doctors of medicine or dentists or veterinary doctors. Included in this group are chemists, bacteriologists, sanitary engineers, food and nutrition experts, nonmedical public health workers and non-professional men experienced in the procurement, storage and distribution of medical equipment and supplies. These men may be commissioned as officers, in rank ranging up to colonel, in the Sanitary Corps of the Medical Department.

Sanitary Corps officers are assigned to appropriate duties in their special fields, such as the supervision of water purification and sewage treatment plants, the planning and management of mosquito control programs, sanitary surveys, nutritional studies and liaison with the Quartermaster Corps. Some act as laboratory officers, while some aid in the procurement of medical supplies or serve in other special Medical Department fields.

PROCUREMENT AND ASSIGNMENT SERVICE

The new Procurement and Assignment Service of the Office of Defense Health and Welfare Services, recently organized in Washington, D. C., should prove to be a valuable agency in coordinating an equitable distribution of physicians, dentists and veterinarians to meet the needs of both the civilian population and the armed services. It will be remembered that the American Medical Association rendered invaluable assistance by distributing questionnaires and classifying the physicians of the United States as to their special qualifications and availability. The Association thus laid the groundwork necessary for the proper functioning of the Procurement and Assignment Service.

Army medical service, in time of war, necessarily will function under severe handicaps that are not encountered in civilian medical practice. Nevertheless a high standard of service must be maintained. Therefore it is anticipated that proportionately greater numbers of trained medical personnel will be needed for the Army than would ordinarily be utilized by a numerically equivalent civilian population.

In conclusion, let us take serious cognizance of the will of the American people to achieve decisive victory in this war. Imbued with a determination to win we can be sure that now, as in previous military conflicts, the people of the United States will insist on adequate care for the health of their soldiers. This can be accomplished only by providing trained personnel in sufficient number to meet the heavy demands of our greatly augmented armed forces.

We are justly proud of the magnificent manner in which American medicine is mobilizing for this war. But an enormous task yet lies ahead. This task will require a rising tide of trained medical personnel to care for the health of the military. The physicians and nurses of 1942 are being called on in ever increasing numbers to rally to the colors for active service with the armed forces. They are expected to respond with determination and courage, as did the splendid medical men and women of 1917.

RUBBER MADE AVAILABLE TO SUPPLY MEDICAL NEEDS

Effective March 1, the drastic curtailment of the use of rubber for nondefense purposes was further modified to permit the additional use of rubber in the manufacture of specific articles necessary in medical practice. By amendment 5 to supplementary order M-15-b, as amended, the War Production Board listed the following groups, among others, of articles for the manufacture of which rubber may be used, subject to certain quantitative limitations set forth in the amendatory order:

LIST A—GROUP 28

Acoustic aids
Blood pressure bags
Brain surgery caps
Breast pumps
Colostomy outfits
Dental separating strips and mouth props
Dilators
Evacuators
Finger cots (medical, surgical, dental, veterinary and laboratory)
Inhalation bags and face pieces (medical, surgical, dental and veterinary)
Invalid rings
Irrigators and hard rubber syringes
Medicine droppers
Nipples (feeding)
Operating cushions
Orthodontia bands
Parts for medical, surgical, dental, veterinary and mortuary instruments
Pessaries and prophylactics
Prostatic bags
Rubber bands for artificial limbs
Rubber denture, denture suction and model formers
Surgeons' gloves (medical, surgical, dental, mortuary and veterinary use)
Surgical tape, medicated footpads and plasters
Tourniquets
Tubes, tubing, including catheters, stopples and rubber policemen (medical, surgical, dental, mortuary, veterinary and laboratory)
Umbilical belts
Urinals—individual wear
Vaccine caps
X ray sheets, gloves, aprons and cooling hose

LIST A—GROUP 29

Bulbs (medical, surgical, dental, mortuary, veterinary and laboratory)
Water bottles and combination syringes

LIST A—GROUP 30

Dental dam
Fountain syringes
Hard rubber pipe, connections and accessories (medical, surgical, dental, mortuary and veterinary)
Hospital sheeting (hospital, ambulance, mortuary and first aid use only)
Ice bags
Metatarsal cushion or pad (not part of shoe)
Truss pad cover

Similarly, the restrictions on the use of latex were modified to permit the manufacture of the following articles, among others, subject to certain quantitative limitations:

LIST C—GROUP 1

Blood pressure bags
Colostomy outfits
Finger cots (medical, surgical, dental, mortuary and veterinary use)
Inhalation bags and face pieces (medical, surgical, dental, laboratory and veterinary)
Irrigators
Nipples (feeding)
Operating cushions
Pessaries and prophylactics
Prostatic bags
Sinus and cautery bulbs
Surgeons' gloves (medical, surgical, dental, mortuary and veterinary use)
Tubes, tubing, including catheters, medical, surgical, dental, mortuary, veterinary and laboratory use)
Urinals, individual wear
Veterinary sleeves

INTERNS RELIEVED OF AMBULANCE RIDING DUTIES

In an appeal to the public to cooperate in reducing unnecessary ambulance calls, Dr. Willard C. Rappleye, commissioner of hospitals of New York City, announced that interns were relieved, beginning February 16, of their ambulance riding duties in order to conserve their skill for the patients in municipal hospital wards and thus to offset shortages due to military requirements. Ambulance attendants experienced in hospital procedures and thoroughly trained for their new duties are replacing the interns on ambulance service of all municipal hospitals. Although the change is made necessary by the war,

the new type of service has long been employed in other large cities with complete satisfaction.

An analysis of ambulance calls in New York for years shows that two hundred and fifty thousand calls a year are from patients for whom no ambulance is required. Patients who thus have been relying on ambulance interns for home medical care must henceforth call their family physicians or attend hospital clinics. In legitimate emergency ambulance cases or in any case of reasonable doubt a person will be taken to a hospital, where a physician will make the diagnosis and prescribe treatment.

In the event of a catastrophe or situation requiring the presence of professional personnel, any one of the eighty-one newly formed disaster units may be dispatched.

HANDBOOK OF FIRST AID

A "Handbook of First Aid" has been issued by the Medical Division of the Office of Civilian Defense in cooperation with the American Red Cross for the use of enrolled civilian defense workers.

The pocket sized handbook has twelve chapters. The book does not replace the standard Red Cross "Textbook of First Aid," which is to be used in first aid classes. Numerous illustrations clarify the procedures. The first aid worker is cautioned against any action that should be left to a physician or any that would handicap the physician when he arrives. The chapter on chemical warfare describes types of war gases and lists briefly under each type the characteristic effects it produces and the appropriate first aid measures. This chapter also includes instruction on care of burns caused by incendiary bombs containing phosphorus.

FIRST AID KITS DISTRIBUTED

Sample emergency medical first aid kits have been distributed by the Medical and Surgical Relief Committee of America to the city and county defense councils of Niagara Falls, Rochester, Binghamton, Schenectady, Nassau, Elmira, Buffalo, Syracuse, Chenango, Westchester, Schoharie, Dunkirk, St. Lawrence, Utica, Albany and Dutchess, N. Y. Each kit is sufficient for demonstration purposes and contains complete supplies for one civilian defense emergency medical team, which is composed of one physician, two graduate nurses and two or more volunteer nurses' aides or first aid workers. At the same time the New York State Council of Defense announces that several chiefs of emergency medical services of civilian defense in New York State have received appropriations from their local defense councils for the purpose of purchasing kits, stretchers and cots.

COURSE ON CIVILIAN DEFENSE AT EDGEWOOD ARSENAL

A special Civilian Defense course was presented at Edgewood Arsenal, Maryland, January 5-10, for U. S. Army and Civilian Defense officers, including a group representing the Medical Division of the Office of Civilian Defense. Drs. Leonard A. Scheele and Harold Marks of the Washington headquarters staff, W. Ross Cameron, Baltimore, regional medical officer of the third Civilian Defense region, and H. Van Zile Hyde, New York, regional medical officer of the second region, were the Civilian Defense medical representatives. Dr. George Baehr, chief medical officer of the Office of Civilian Defense, and Dr. Scheele presented the program of the Medical Division. The subjects taught included aerial attack, aircraft warning, incendiary materials, blackouts, subversive activities, espionage and sabotage, fire equipment, industrial plant and building protection, police training, Federal Bureau of Investigation activities, property accountability, and integration and functions of the Citizens' Defense Corps. Cooperative programs of the American Red Cross, the American Legion and the Boy Scouts of America were outlined by officials of those organizations. The students operated a typical control center. The class members, acting as heads of the various protection services, dispatched the necessary people and equipment to each incident to handle the problem there.

ORGANIZATION SECTION

OFFICIAL NOTES

ABSTRACT OF MINUTES OF MEETINGS OF BOARD OF TRUSTEES HELD FEB. 18-20, 1942

Careful consideration was given to the business of the Association at the annual meeting of the Board of Trustees, which was held in the headquarters office February 18-20, preceded by a full day meeting of the Executive Committee. Many subjects, too numerous to mention in the brief space available here, were considered.

MEETING WITH REPRESENTATIVES OF ASSOCIATION OF AMERICAN MEDICAL COLLEGES AND COUNCIL ON MEDICAL EDUCATION AND HOSPITALS

A conference was held with members of the Executive Council of the Association of American Medical Colleges and members of the Council on Medical Education and Hospitals for a discussion of problems of mutual interest, particularly with a view to avoiding duplication of effort and of conserving the energy of the physician. After considerable discussion a joint committee was appointed to decide on matters of policy and to make recommendations to the Council and to the Association of American Medical Colleges. The committee consists of Dr. Herman G. Weiskotten, Dr. Charles Gordon Heyd and Dr. Reginald Fitz to represent the Council on Medical Education and Hospitals, and Dr. A. C. Bachmeyer, Dr. Fred C. Zapffe and Dr. E. M. MacEwen to represent the Association of American Medical Colleges.

APPROPRIATIONS

Appropriations were made for the conduct of the work of the various departments in the headquarters office and of committees, for necessary conferences and for scientific and therapeutic research.

WAR MEDICINE

Consideration was given to the request that *War Medicine* be published monthly. The final decision will be made after some necessary investigation has been completed.

INVESTMENTS

Careful consideration was given to investing some of the funds of the Association, and authorization was given for the purchase of bonds.

EXTENSION OF SOCIAL SECURITY LAW

Consideration was given to the proposed extension of the Social Security Law, and the Editor was especially authorized to prepare for publication an editorial based on the discussion which the subject elicited.

APPOINTMENTS

The following appointments were made to editorial boards of special journals and to councils and committees (unless otherwise stated, the appointee succeeds himself):

American Journal of Diseases of Children, Dr. C. G. Grulee; and Dr. Alexis Hartmann of St. Louis to succeed Dr. A. Graeme Mitchell (deceased). *Archives of Dermatology and Syphilology*, Dr. Howard Fox. *Archives of Ophthalmology*, Dr. Arnold Knapp. *Archives of Pathology*, Dr. Frank R. Menne. *Archives of Neurology and Psychiatry*, Dr. John Whitehorn. *Archives of Internal Medicine*, Dr. Russell M. Wilder. *Archives of Otolaryngology*, Dr. Ralph A. Fenton. *Archives of Surgery*, Dr. William Darrach. Committee on Scientific Research, Dr. E. W. Goodpasture. Committee for the Protection of Medical Research, Dr. Anton J. Carlson and Dr. G. W. McCoy. Council on Pharmacy and Chemistry, Dr. S. W. Clausen, Dr. E. M. K. Geiling and Dr. W. W. Palmer; Dr. E. K. Marshall Jr. of Baltimore to succeed Dr. Soma Weiss (deceased). Council on Foods and Nutrition, Dr. C. A. Elvehjem and Dr. Philip C. Jeans. Council on Industrial Health, Dr. Warren Draper, Dr. Raymond Hussey, Dr. Henry H. Kessler and Dr. Clarence D. Selby; Dr. William D. Stroud of Philadelphia to succeed Dr. C. W. Roberts (resigned). Council on Physical Therapy, D. A. C. Cipollaro; and Dr. George M. Piersol of Philadelphia

and Dr. M. A. Bowie of Bryn Mawr, Pa., to succeed Dr. Harry E. Mock and Dr. Ralph Pemberton.

National Rabies Committee, Dr. Walter A. Bastedo and Dr. John L. Rice, New York.

Policy Forming Committee for the Direction of the Accreditation Program of the National League of Nursing Education, Dr. Herman G. Weiskotten.

Agricultural and Industrial Relations Committee of Eastern, Western and Southern Regional Research Laboratories, Dr. Arthur W. Booth, Elmira, N. Y.; Dr. Robert S. Peers, Oakland, Calif., and Dr. James S. McLester, Birmingham, Ala.

Joint Committee on Health Problems in Education of National Education Association and American Medical Association, Dr. W. W. Bauer to succeed himself for a five year term.

COMMITTEE APPOINTED TO PREPARE MEMORIAL RESOLUTIONS IN HONOR OF DR. WILLIAM D. CUTTER

A committee of three was appointed to prepare memorial resolutions conveying the sentiment of the Board regarding their departed colleague Dr. William D. Cutter, a copy of which is to be sent to his widow.

DR. ROSCO G. LELAND APPOINTED MEMBER OF HEALTH AND MEDICAL COMMITTEE

The Board approved the appointment of Dr. Rosco G. Leland, Director of the Bureau of Medical Economics, as a member of the Health and Medical Committee of the Selective Service System, which committee is to advise the Division of Research and Statistics in matters pertaining to the statistical analysis of reports of physical examination and other individual records prepared for registrants under the jurisdiction of the Selective Training and Service Act of 1940, as amended.

DR. A. E. SMITH APPOINTED ACTING SECRETARY OF COUNCIL ON PHARMACY AND CHEMISTRY

The Board approved the appointment of Dr. A. E. Smith, who has been a member of the staff of the Council on Pharmacy and Chemistry, as Acting Secretary of that council on the resignation of Dr. T. G. Klumpp.

SUCCESSOR TO DR. WILLIAM D. CUTTER

The Board approved the recommendation of the Council on Medical Education and Hospitals that Dr. Herman G. Weiskotten be selected to succeed Dr. William D. Cutter as Secretary of the Council on Medical Education and Hospitals.

GRADUATE STUDENTS TO OBSERVE WORK OF HEALTH EDUCATION IN ASSOCIATION HEADQUARTERS

The Board authorized the extending of permission to graduate students, including physicians and teachers—one or two at a time—to spend one or two weeks in the office of the American Medical Association to observe the work of the Bureau of Health Education and to become acquainted with the functions of other bureaus which touch on the work of health education.

DIRECTOR OF BUREAU OF LEGAL MEDICINE AND LEGISLATION

The Board designated Mr. J. W. Holloway Jr., who has been "Acting Director" of the Bureau of Legal Medicine and Legislation since the retirement of Dr. W. C. Woodward, Director of that bureau.

COOPERATION WITH UNITED STATES OFFICE OF EDUCATION IN FURNISHING MATERIAL FOR PACKETS FOR CONSUMER EDUCATION

Authorization was given to the headquarters staff to cooperate with the United States Office of Education by furnishing pamphlets and other material considered useful to the Information Exchange on Education in Wartime of the United States Office of Education. This material will be included in the packets which it is assembling on the consumer in war time with a view to making the most recent and pertinent material available to a wide range of readers.

Medical News

(PHYSICIANS WILL CONFER A FAVOR BY SENDING FOR THIS DEPARTMENT ITEMS OF NEWS OF MORE OR LESS GENERAL INTEREST: SUCH AS RELATE TO SOCIETY ACTIVITIES, NEW HOSPITALS, EDUCATION AND PUBLIC HEALTH.)

ALABAMA

Changes in Health Officers.—Dr. Thomas M. Littlepage, Mount Sterling, has been appointed health officer of Choctaw County.—Dr. Ernest A. Cook, Wedowee, has been appointed health officer for Cleburne County, succeeding Dr. Corinne S. Eddy, Centerville, resigned.—Dr. Charles Jack Fisher, Montgomery, has been appointed health officer of Tuscaloosa County succeeding Dr. Arthur A. Kirk, who resigned after many years of service. The change is effective on April 1. Dr. Fisher who is now in charge of the venereal disease program of the state department of health, formerly served as health officer of Butler County.

CALIFORNIA

Personal.—Dr. Oswald N. Andersen was chosen president-elect of the Santa Clara County Tuberculosis Association in San Jose, January 23. Dr. Andersen is director of the School of Health of Stanford University at Stanford University; he formerly served on the staff of the Council on Medical Education and Hospitals of the American Medical Association.

Dr. Seeley Mudd Named Dean at University of Southern California.—Dr. Seeley G. Mudd, Pasadena and Los Angeles, has been appointed dean of the University of Southern California School of Medicine, Los Angeles. He succeeds the late Paul B. McKibben, Ph.D. Dr. Mudd graduated at Harvard Medical School, Boston, in 1924. He is a member of the California Institute Associates, a nonprofit organization to promote the interests of the California Institute of Technology.

Annual Lecture Course.—The ninth annual lecture course of the San Jose Hospital Association will be presented at the San Jose Medico-Dental Building Auditorium on the early clinical diagnosis of neoplastic diseases. Dr. William Carpenter MacCarty, professor of pathology, University of Minnesota Graduate School, Minneapolis-Rochester, will be the speaker. His subjects will be:

- March 23, Our General Knowledge of Neoplastic Diseases.
- March 24, Gastrointestinal Tract.
- March 25, Breast, Uterus and Ovaries.
- March 26, Kidney, Bladder and Testicle.
- March 27, Bones, Soft Tissues, Lymph Nodes and Ductless Glands.

Plague Infection in Fleas.—According to *Public Health Reports*, plague infection has been proved by animal inoculation and by cultures in fleas from ground squirrels *Citellus douglasii* as follows: in a pool of 31 fleas from 2 ground squirrels, and in another pool of 18 fleas from 1 ground squirrel, submitted to the laboratory on October 24 from locations 26 and 28 miles north of Redding, Shasta County; in a pool of 27 fleas from 2 ground squirrels submitted on October 21 from property 3½ miles north and ½ mile west of Mount Shasta City, and in a pool of 91 fleas from 4 ground squirrels submitted on October 22 from a ranch about 2 miles northeast of Edgewood, both locations in Siskiyou County.

CONNECTICUT

Dr. Braun-Menendez Speaks at Yale.—Dr. Eduardo Braun-Menendez, director of cardiovascular investigations and lecturer in physiology, Faculty of Medical Sciences, University of Buenos Aires, Buenos Aires, Argentina, addressed a special meeting of the Yale Medical Society in the Brady Memorial Laboratory, New Haven, February 25, on "Humoral Mechanism of Renal Experimental Hypertension."

DELAWARE

Society News.—Dr. Lester Neuman, Washington, D. C., addressed the New Castle County Medical Society in Wilmington, January 20, on "New Horizons in Clinical Pathology." Dr. Robert E. Moran, Washington, D. C., discussed "Indications for Various Grafts" before the society recently.

Health Association Organized.—At a recent meeting in Wilmington the Delaware Public Health Association was organized with the following officers: Dr. Edwin Cameron,

Dover, president; Dr. George H. Gehrman, Wilmington, and Mrs. Anna Van W. Castle, R.N., Wilmington, vice presidents; G. Taggart Evans, Wilmington, secretary, and Dr. Roger Murray, Wilmington, treasurer.

GEORGIA

New Professor of Neurology.—Dr. Wilford Arless Risteen, Rochester, N. Y., has been appointed professor and head of the department of neurologic surgery at the University of Georgia School of Medicine, Augusta, succeeding the late Dr. Richard Frank Slaughter. Dr. Risteen graduated at the University of Wisconsin Medical School, Madison, in 1930.

Changes in Health Officers.—Dr. Wilbur D. Lundquist, Waynesboro, health commissioner of Burke County, will during the present year devote half of his time to Jenkins County, which has been without a health officer since Dr. Isbin S. Giddens, Millen, resigned to enter the army.—Dr. Anthony Ralph Marsicano, formerly of Coolidge, has been named health commissioner of Coffee County.

ILLINOIS

Warning Against Coal Tar Drugs.—The state department of health has issued a warning against the unsupervised and indiscriminate use of such coal tar drugs as sulfanilamide, sulfapyridine and sulfathiazole. The warning followed a recent death in Chicago, which was ascribed to the patient's taking an overdose of sulfathiazole without medical supervision. The patient, who was taking sulfathiazole for gonorrhea without an attending physician, finally entered the hospital with a severe sore throat, a high temperature, an abnormally low white blood cell count, and he died nine hours later.

Dr. Adair Named Chief of Maternal and Child Hygiene.—Dr. Fred L. Adair, Mary Campau Ryerson professor of obstetrics and gynecology and chairman of the department, University of Chicago, The School of Medicine, Chicago, has been appointed chief of the state division of maternal and child hygiene, effective March 1. Dr. Adair graduated at Rush Medical College, University of Chicago, in 1901. He has held many important positions concerned with his specialty. In 1930 he was chairman of the Committee on Prenatal and Maternal Care of the White House Conference on Child Health and Protection. From 1928 to 1931 he was secretary of the Section on Obstetrics, Gynecology and Abdominal Surgery of the American Medical Association, serving as chairman from 1931 to 1932. Currently he is general chairman of the American Committee on Maternal Welfare, Inc.

Chicago

Personal.—Dr. Arno B. Luckhardt, professor and chairman of the department of physiology, University of Chicago, The School of Medicine, was elected an honorary member of the St. Louis Medical Society, Dec. 10, 1941.

Branch Meetings.—The North Shore Branch of the Chicago Medical Society was addressed, March 3, by Dr. Geza de Takats on "Treatment of Thrombosis and Embolism."—Drs. David E. W. Wenstrand, Milwaukee, and Arthur C. Christie, Washington, D. C., will address the Northwest Branch of the Chicago Medical Society, March 20. Their subjects will be "The Prevalence of Cancer Today" and "What is Being Done to Control Cancer" respectively.

Society News.—The Chicago Orthopaedic Society was addressed, February 13, by Dr. Guy A. Caldwell, New Orleans, on "The Time Factor as Relates to Local Implantation of Sulfathiazole in Compound Fractures" and Dr. Walter P. Blount, Milwaukee, "Internal Fixation in High Femoral Osteotomies."—At a meeting of the Chicago Society of Internal Medicine, February 23, Drs. Clayton J. Lundy and Myron W. Larson, Aurora, Ill., spoke on "Clinical Evaluation of Heart Sound Records in Rheumatic Heart Disease."—Dr. Paul H. Holinger will address the Chicago Tuberculosis Society, March 19, at the Bismarck Hotel on "The Larynx, Tracheobronchial Tree and Esophagus in Kodachrome: Color Motion Pictures Taken Through the Laryngoscope, Bronchoscope and Esophagoscope." Dr. Loren L. Collins, Ottawa, will discuss a "Case Finding Program in La Salle and De Kalb Counties."

Society Cooperates in Manning Casualty Stations.—The Chicago Medical Society and its branch societies are contributing their services as physicians in charge of the casualty stations and first aid posts being established by emergency medical services of the Chicago Metropolitan Civilian Defense Area to serve during catastrophes.—At a meeting on March 1 the group received its initial instructions. Speakers included

Drs. Herman N. Bundesen, chief of emergency medical services in this area; H. Prather Saunders, chairman of the coordinator's medical advisory council committee on physicians, and Loyal Davis, chairman of the council committee on first aid posts and casualty stations. Up to March 1, 376 casualty stations had been designated in the local civilian defense area. These are the stations from which first aid teams will go forward to first aid stations at the actual scene of a catastrophe and through which victims will be cleared to hospitals when they require more than first aid treatment.

Neuropsychiatric Meeting.—The Central Neuropsychiatric Hospital Association will meet at the Medinah Club, March 19-20, under the presidency of Dr. Russell C. Doolittle, Des Moines, Iowa. The speakers include:

- Dr. Roy R. Grinker, What the Referring Physician Expects of the Private Psychiatric Hospital.
- Dr. George T. Harding, Columbus, Ohio, Acute Problems Facing the Private Psychiatric Hospital.
- Dr. Titus H. Harris, Galveston, Texas, Psychiatry and the National Emergency.
- Dr. Henry D. Allen Jr., Milledgeville, Ga., Community and Public Responsibility of the Private Psychiatric Hospital.
- Dr. Lloyd H. Ziegler, Wauwatosa, Wis., Advertising Methods of the Psychiatric Institution.
- Dr. James C. Hassall, Oconomowoc, Wis., Recommendations for Standardization of Private Psychiatric Institutions.
- Dr. George S. Sprague, White Plains, N. Y., Treatment Methods in a Psychiatric Institution.
- T. V. McDavitt, LL.D., Chicago, Legislation and the Private Psychiatric Hospital.
- Dr. William C. Menninger, Topeka, Kan., Morale and the Private Psychiatric Hospital.

The evening meeting on Thursday will be a joint session with the Chicago Neurological Society.

INDIANA

County Society Secretary for Sixty-Three Years.—Dr. Wilson T. Lawson, Danville, was honored at the annual conference of state secretaries of the Indiana State Medical Association in Indianapolis recently in recognition of his sixty-three years' service as secretary of the Hendricks County Medical Society. Dr. Lawson is said to be the oldest secretary of a medical society in Indiana in both length of service and years of age. He is 92 years old. He also serves as health officer of the county. Dr. Lawson graduated at Miami Medical College, Cincinnati, in 1878.

Changes in Health Personnel.—The state medical journal reports that the following physicians have been named health officers of the counties indicated:

- Dr. Jesse E. Nixon, Portland, Jay County.
- Dr. James H. Crowder, II, Sullivan, Sullivan County.
- Dr. George R. Douglas, Valparaiso, Porter County.
- Dr. Elton R. Clarke, Kokomo, Howard County.
- Dr. James E. Keeling, Waldron, Shelby County.
- Dr. John S. Gikison, Shoals, Martin County.
- Dr. Charles F. Pectol, Spencer, Owen County.
- Dr. Harold B. Turner, Bloomfield, of Greene County.

The following have been reappointed health officers of their counties: Dr. Orville A. DeLong, Elizabethtown, of Bartholomew County; Ira E. Perry, North Manchester, of Wabash County; Charles W. Atkinson, Boswell, Benton County; Oscar S. Heller, Greenfield, Hancock County, and Fred W. Grayson, Huntington, of Huntington County.—Dr. James R. Hamilton, Mitchell, has been appointed city health officer to succeed the late Dr. James D. Byrns.

KANSAS

Society News.—Dr. Florian E. Schmidt, Chicago, discussed "Management and Treatment of Pneumonia" before the Sedgwick County Medical Society in Wichita, February 17.—Dr. Maxwell Gitelson, Chicago, addressed the Topeka Psychoanalytic Society, January 31, among others, on "Intellectuality and the Defense Transference." Dr. Gitelson addressed the Shawnee County Mental Hygiene Society, January 30, on "The Child Guidance Clinic."

Changes in Psychiatric Training Program.—The Menninger Clinic of Topeka recently announced changes in its psychiatric training program in order to comply with the requirements of the American Board of Neurology and Psychiatry for a three year training period of a specific nature. Instead of one year residencies a three year training program has been inaugurated, the first year is to be known as a residency, the second a fellowship and the third as an assistantship. Assistants will be eligible to election to associate staff membership in the Menninger Clinic on completion of their training.

MARYLAND

Association of Medical Health Laboratories.—The Maryland Association of Medical and Public Health Laboratories held its midwinter meeting in Baltimore, February 11. The speakers included Captain Roger J. Reid, Fort George G. Meade, "Organization of Laboratory Work in the Army"; Dr. Caroline A. Chandler, instructor in preventive medicine, Johns Hopkins University School of Medicine, Baltimore, "Laboratory Procedures for the Isolation and Identification of Beta Hemolytic Streptococci"; John H. Brewer, Ph.D., Baltimore, bacteriologist, I. J. Carski, A.B., manager, Baltimore Biological Laboratory, and Mrs. Rebecca Govons, M.A., associate bacteriologist, state department of health, Baltimore, "Bacteriological Culture Media," and Miss Anna Ryan, A.B., chemist, Harriet Lane Home, Johns Hopkins Hospital, Baltimore, "Micromethods for the Chemical Analysis of Blood."

MASSACHUSETTS

Tufts Alumni Meeting.—The Tufts Medical Alumni Association will hold its annual meeting and dinner at the Hotel Somerset, Boston, March 25, with Dr. James W. Manary, superintendent and medical director of the Boston City Hospital, presiding. The chief speaker will be Dr. Frank H. Lahey, Boston, President of the American Medical Association, whose subject will be "The Doctor's Place Today." Other speakers will include Leonard Carmichael, Ph.D., president of Tufts College, Medford; Dr. Frank R. Ober, Boston, president of the state medical society, and Dr. Alonzo K. Paine, professor of obstetrics at Tufts. A report of twenty-five years of the class of 1917 will be presented by Dr. Roy J. Heffernan, Boston. Dr. Priscilla White, Boston, will speak on "The Woman Physician."

MICHIGAN

Ninetieth Birthday of Dr. Kellogg.—Dr. John Harvey Kellogg, associated with the Battle Creek Sanitarium as surgeon and superintendent since 1876, was guest of honor at a dinner in the sanitarium, February 26, given by the local chamber of commerce and the Calhoun County Medical Society to mark his ninetieth birthday. He was presented with a specially inscribed scroll. Dr. Kellogg was born in Tyrone, Mich., Feb. 26, 1852. He graduated at Bellevue Hospital Medical College, New York, in 1875. He was a member of the state health board from 1878 to 1890 and from 1912 to 1916. He was founder of the health food industries of Battle Creek and founder and president emeritus of Battle Creek College and the Race Betterment Foundation, serving as its president. He has written numerous articles concerned with diet and health.

MINNESOTA

Society News.—The Minnesota Pathological Society was addressed in Minneapolis, February 17, by Drs. Owen H. Wangenstein on "Genesis of Gastric and Duodenal Ulcer with Experimental and Clinical Studies" and Robert Hebbel on "Pathologic Changes in the Gastric Mucosa in Association with Gastric and Duodenal Ulcer." Both are from Minneapolis.—Dr. Archibald E. Cardie presented a thesis on "The Pituitary Gland and Diabetes Mellitus" at the Minnesota Academy of Medicine meeting, St. Paul, February 11, and Dr. Walter E. Camp presented a case report on "Malignant Exophthalmos"; both are from Minneapolis.

Special Lectures.—Dr. William D. Stovall, Madison, Wis., director of the state laboratory of hygiene and professor of hygiene, University of Wisconsin Medical School, Madison, lectured at a dinner meeting of the Minnesota Society for the Control of Cancer on February 24. His subject was "Cancer, Its Prevention and Control." Drs. Maurice B. Visscher and Owen H. Wangenstein presented a program on shock before the Hennepin County Medical Society on March 2. Dr. Visscher discussed the theories underlying the causes and mechanism of shock, and Dr. Wangenstein their practical application.

NEBRASKA

New Director of Local Health Service.—Dr. Wallace S. Petty, formerly head of the Sioux City and Woodbury County (Iowa) health units, has been appointed director of local public health service for the state department of health, Lincoln. Dr. Petty recently completed a course in public health at the University of Minnesota, Minneapolis.

Public Health Forum.—The Omaha health department presented the second in a series of public health forums for the citizens of Omaha on February 9. The theme was "Venereal Disease Control in War." Dr. Charles McMartin, professor of dermatology and urology, Creighton University School of Medicine, Omaha, was chairman of the panel.

NEVADA

Alleged Abortionist Located.—Valentine St. John, a fugitive from justice in the state on charges of abortion, has been located in Canada and attempts are being made to extradite him to Reno for trial, according to information from the office of the district attorney in Washoe County, January 30. In a criminal complaint filed on Nov. 20, 1940 in the Washoe County district court St. John was one of a group of six persons charged with having committed an abortion. R. L. Rankin and Paul Cushing, two of those named, who were sentenced to terms of from one to five years in the Nevada State Penitentiary, Carson City, are now confined there. The names of St. John, Rankin and Cushing appeared in a criminal complaint which was issued in connection with the so-called Pacific Coast abortion ring in 1936. As a result of the investigation all three were sentenced to terms in San Quentin. St. John successfully appealed his conviction and sentence.

NEW YORK

Annual Spring Clinical Day.—The University of Buffalo School of Medicine Medical Alumni Association will hold its eighth annual spring clinical day on March 28 at the Hotel Statler, Buffalo. The speakers will be Drs. Philip S. Hench, Rochester, Minn.; Carl E. Badgley, Ann Arbor, Mich.; Maxwell M. Wintrobe, Baltimore; Harold T. Hyman, New York, and Frank H. Lahey, Boston, President of the American Medical Association.

Graduate Course.—The Medical Society of the State of New York is sponsoring a postgraduate course in arteriosclerosis and aging, arranged by Dr. John Murray Steele, New York, for the Jefferson County Medical Society. The lectures will be given at the Black River Valley Club, Watertown, by the following New York physicians:

- Dr. Steele, Clinical Interpretation of Modern Physiological Concepts, April 9.
- Dr. Sigmund L. Wilens, Pathological Aspects, April 16.
- Dr. S. Bernard Wortis, Neuropsychiatric Aspects; Diagnosis and Treatment, April 23.
- Dr. William Goldring, Renal and Cardiac Aspects; Diagnosis and Treatment, May 14.
- Dr. Irving S. Wright, Peripheral Vascular Aspects; Diagnosis and Treatment, May 21.

Decrease in Suicides.—The state department of health, in a report for 1941, announces a decrease in suicides, which may be taken as an "indication of the greater sense of individual security and the better moral tone of the people." There were one thousand eight hundred and forty-four suicides in 1941, four hundred less than in 1940, and nine hundred less than in 1932, when an all time high of 21.2 was recorded. According to *Health News* the financial panic was undoubtedly the main, if not the only, reason for the 20 per cent increase in suicides in the state in 1908, while the 1932 total reflected the cumulative weight of the last depression. The death rate for the state per thousand of population was 10.9, the birth rate per thousand of population 15.5, the infant mortality thirty-three deaths under 1 year per thousand live births, and the maternal mortality rate 22 per 10,000 live and still births. New low rates for the state were established for the mortality from typhoid, scarlet fever, whooping cough, diphtheria, diarrhea under 2 years, tuberculosis, appendicitis, hernia and accidents, excepting automobile fatalities. The rate for this last group was 19.4, or 7 per cent above the 1940 figure.

New York City

Lectures to the Public.—A series of lectures to the public is now being given at the New York Academy of Medicine. Included among the lecturers is Dr. Arnold L. Gesell, director of the Clinic of Child Development, Yale University School of Medicine, New Haven, on "Creative Behavior in Child and Adult."

Dr. McLester to Give Biggs Memorial Lecture.—Dr. James S. McLester, Birmingham, professor of medicine, University of Alabama School of Medicine, and formerly President of the American Medical Association, will deliver the Hermann M. Biggs Memorial Lecture at the New York Academy of Medicine, April 2. His subject will be "Nutrition and the Nation at War."

Sixth Harvey Lecture.—Dr. Albert R. Behnke Jr., lieutenant commander, medical corps, U. S. Navy, instructor in charge of department of atmospheric hygiene, U. S. Navy Yard, Washington, D. C., will deliver the sixth Harvey Society Lecture of the current series at the New York Academy of Medicine, March 19. His subject will be "Physiologic Studies Pertaining to Aviation Medicine and Deep Sea Diving."

Friday Afternoon Lectures.—Lectures in the sixteenth series of Friday afternoon lectures at the New York Academy of Medicine include Drs. Rupert Franklin Carter, February 27, on "Modern Methods of Diagnosis in Disorders of the Gallbladder"; Thomas H. Russell, March 6, "Indications for Surgery and the Surgical Treatment of Diseases of the Gallbladder," and George F. Cahill, March 13, "Recent Advances in Certain Renal Surgical Problems."

Symposium on Diabetes.—The New York Diabetes Association, Inc., will devote a clinical meeting at the New York Academy of Medicine, March 26, to a symposium on "Reduction in Mortality Due to Gangrene in the Diabetic." The speakers will be Drs. Frederick W. Williams, By Prevention; Samuel Standard, By Use of Sulfonamide Drugs; Lyman W. Crossman, By Use of Cold as an Anesthetic Agent for Amputations, and Beverly C. Smith, By Amputations Below the Knee.

Inter-American Bureau of Academy of Medicine.—The New York Academy of Medicine has organized an Inter-American Division with the objective of cultivating friendship, understanding and sympathy with the medical men in other countries of the Americas. The bureau of clinical information of the academy has made provisions to welcome medical visitors from the American countries and to extend to them its facilities for the pursuit of knowledge. A Spanish physician who can converse in Spanish, Portuguese and English will be available to these visitors. The bureau also publishes a daily bulletin of clinics, meetings, lectures, conferences, hospital rounds and other medical activities, according to *Science*.

NORTH CAROLINA

Society News.—Dr. Maurice Barnes Woodhall, Durham, discussed "Diagnosis and Treatment of Sciatica" before the Halifax County Medical Society recently in Roanoke Rapids. —A recent meeting of the Forsyth County Medical Society was addressed in Winston-Salem by Dr. Robert L. McMillan, Winston-Salem, on "Typhus Fever and the So-Called Q Fever." —The North Carolina Obstetrical and Gynecological Society was recently addressed in Charlotte, among others, by Dr. Otis Hunter Jones, Charlotte, on "X-Ray Studies of the Pelvis and Fetal Pelvic Relationship."

Vital Statistics.—The North Carolina State Department of Health announced recently that only 53 deaths from puerperal septicemia were recorded in 1941 as compared with 112 in 1940, a noticeable decline. The 1941 birth rate was 23.6, as compared with 22.7 the previous year. The death rate dropped from 9.0 to 8.9, the lowest recorded in the state. The number of deaths among babies a year old was 5,073, as compared with 4,676 the preceding year, giving a rate of 59.4 per thousand live births. There were 354 maternal deaths in 1941 as against 438 in 1940, giving a rate of 4.1. Deaths from diphtheria during the year dropped from 119 to 89. This change reflects the compulsory immunization law passed by the 1939 legislature, according to the state board of health.

OHIO

Changes in Child Hygiene Personnel.—Dr. Arthur W. Thomas, Columbus, chief of the division of child hygiene, Ohio State Department of Health, has been appointed chief of the subdivision of child hygiene in the Cleveland Department of Health, effective February 1. Dr. Thomas succeeds Dr. Rudolph J. Ochsner, Cleveland, who has retired after thirty years' service.

Selman Memorial Lectures.—The fourth annual Julius J. Selman Memorial Lectures were given at Mount Sinai Hospital, Cleveland, February 9-10, by Dr. Otto Loewi, research professor of pharmacology, New York University, New York. His subjects were "The Chemical Transmissions of Nervous Impulse" and "Regulation and Adaptation of the Organism." The lectures were established as a memorial in 1938 to the late Dr. Selman.

First Annual Institute on Epilepsy.—The Auracraft Shop of the Association for the Crippled and Disabled held its first annual Institute on Epilepsy at the Cleveland Health Museum, February 26. The program opened with a historical survey by Dr. Joseph L. Fetterman, Cleveland. Other speakers were Dr. Alexander T. Bunts, Dr. John H. Nichols and Miss Bell Greve, executive secretary of the association. There were exhibits on the roentgenologic and electroencephalographic aspects of epilepsy.

Society News.—The Academy of Medicine of Cincinnati was addressed, February 17, by Drs. John G. Mateer, Detroit, on "Comparative Sensitivity and Reliability of the Newer Liver Function Tests and Their Relationship to Medical and Surgical Problems" and Lawrence S. Fallis, Detroit, "Gastric Surgery."—Dr. Julius M. Rogoff, Pittsburgh, discussed "The Adrenal Glands in Relation to Hypertension and Diabetes" before the Mahoning County Medical Society, February 17.—Dr. John S. Lockwood, Philadelphia, discussed the sulfonamides before the Summit County Medical Society, February 3.

OREGON

Society News.—Dr. Curle Latimer Callander, San Francisco, presented two graduate lectures before the Portland Academy of Medicine at the University of Oregon Medical School, Portland, February 5-6, on "A New Tendoplastic Amputation Through the Femur at the Knee" and "The Story of the Peritoneum with Its Clinical Applications."—The Multnomah County Medical Society was addressed, January 7, in Portland by Drs. John A. Gius, Portland, on "Theodore Billroth, the Father of Visceral Surgery"; Goodrich C. Schaufliker, Portland, "Pediatric Gynecology," and Albert W. Holman, Portland, "Hydatid Mole and Chorioepithelioma."

Sommer Memorial Lectures.—The second series of Sommer Memorial Lectures will be given at the University of Oregon Medical School, Portland, March 23-25, under the auspices of the University of Oregon Alumni Association. Dr. George W. Holmes, clinical professor of roentgenology, Harvard Medical School, Boston, will be a guest speaker for the alumni association and discuss "Irradiation in the Treatment of Malignant Tumors," "Roentgen Diagnosis of Obstructive Bronchial Lesions" and "Recent Advances in the Roentgen Diagnosis of Lesions of the Gastrointestinal Tract." Dr. Harvey B. Stone, associate professor of surgery, Johns Hopkins University School of Medicine, Baltimore, will present "Surgical Treatment of Biliary Diseases," "Intestinal Obstruction" and "Surgery of the Colon."

PENNSYLVANIA

Society News.—Dr. Nicholson J. Eastman, Baltimore, will address the Harrisburg Academy of Medicine, March 17, on "Obstetrical Hemorrhage."—Dr. Joseph H. Barach, Pittsburgh, addressed the Indiana County Medical Society, Indiana, February 12, on "Treatment of the Complications of Diabetes."

Philadelphia

Outbreak of Scarlet Fever.—An epidemic of scarlet fever has been indicated in the city according to the newspapers, February 21. There were 170 cases of the disease reported in the week ended February 20 as compared with 142 new cases in the preceding week.

VIRGINIA

Annual Graduate Course in Diseases of the Eye, Ear and Throat.—The sixteenth annual spring graduate course of the Gill Memorial Eye, Ear and Throat Hospital will be held in Roanoke, April 6-11. The guest lecturers will include:

- Dr. George E. Shambaugh Jr., Chicago, Treatment of Acute Middle Ear Conditions.
- Dr. George M. Coates, Philadelphia, The Nose and Throat as a Focus of General Infection.
- Dr. Warren B. Davis, Philadelphia, The Management of Fractures of the Facial Bones Extending into the Nasal Accessory Sinuses and the Management of Recent Fractures of the Nose.
- Dr. John F. Erdmann, New York, Ludwig's Angina.
- Dr. John R. Richardson, Boston, Applied Anatomy of the Head and Neck and Anatomy of Ethmoid Sinuses.
- Dr. William E. Grove, Milwaukee, Diagnosis and Treatment of Acute Sinusitis and Osteomyelitis.
- Dr. Norton Canfield, New Haven, Conn., Fundamentals of Sound With a View of the Physical Principles Involved in Sound Perception.
- Dr. Edwin N. Broyles, Baltimore, Papilloma of the Larynx in Children and Carcinoma of the Larynx.
- Dr. William Gayle Crutchfield, Richmond, Va., Intraaural Complications Arising from Infection of the Ear and Sinuses.
- Dr. Edwin B. Dunphy, Boston, Ophthalmic Therapeutics.
- Dr. Earl L. Burky, Baltimore, The Clinical Use of Staphylococcus Toxin and Antitoxin and Differential Diagnosis and Therapy of Ocular Infection.
- Dr. Harvey E. Thorpe, Pittsburgh, Methods of Examination and the Cornea; Illustrated Lectures on Slit Lamp Microscopy.
- Dr. Bennett Y. Alvis, St. Louis, Headache as a Problem for the Ophthalmologist.
- Dr. Wendell L. Hughes, Hempstead, N. Y., Series of Lectures Covering Extraocular Muscles and Clinical Demonstration Showing Methods of Measuring Muscle Imbalance.
- Dr. Edmund B. Spaeth, Philadelphia, Indications for Cataract Surgery.
- Dr. Richard Townley Paton, New York, Intraocular Tumors and Their Clinical Diagnosis.
- Dr. Plinio H. Mentalvan, New York, Refraction: Routine Procedures.

GENERAL

Fund for Cardiologic Research.—A special fund has been placed in the charge of the Committee on Scientific Research of the American Medical Association to support cardiologic research by young physicians in medical practice. Inquiries may be addressed to the committee, 535 North Dearborn Street, Chicago.

Interned Germans Are Ill from Trichinosis.—The entire interned crew of four hundred of the German ship *Columbus* were ill of trichinosis at Fort Stanton, N. M., newspapers reported, February 17. The report stated that the German crew was interned while the United States was a neutral, and the German government paid for its subsistence prior to the declaration of war. Under those conditions the German captain inspected the packing plant which supplied meat for the camp and contracted for delivery of the pork which the interned crew members ground and made into sausage, it was said. The U. S. Department of Agriculture is investigating the plant which supplied the meat, according to the report.

Treatment of Insane Persons in U. S. Narcotic Hospitals.—By executive order, February 26, the President authorized the Federal Security Administrator to admit, to the extent that he may deem advisable, insane persons, except those from the District of Columbia, to the U. S. Public Health Service hospitals at Lexington, Ky., and Fort Worth, Texas, for care and treatment on the same terms and conditions as such persons may be entitled to admission to St. Elizabeths Hospital, at Washington, D. C. The administrator was also authorized to transfer insane persons from St. Elizabeths Hospital to such Public Health Service hospitals. The issuance of this executive order was prompted by the fact that, owing to the increase in the armed forces of the United States, the number of insane persons now admitted and entitled to admission to St. Elizabeths Hospital at Washington is greater than that hospital can accommodate properly. The two public health service hospitals, it was pointed out, have adequate facilities and personnel for the care and treatment of insane persons without impairing the efficiency of the service for the purposes for which the hospitals were created and are now maintained.

American Gastroscopic Club.—Announcement has been made of the organization of the American Gastroscopic Club. In its objectives emphasis is placed on the fact that the gastro-scope should be an instrument used by internists and surgeons and not by technical specialists. The officers include Drs. Rudolf Schindler, Chicago; Edward B. Benedict, Boston, and Joseph B. Kirsner, Chicago. Applicants for membership must have adequate training in internal medicine, gastroenterology or surgery; they must be members of a scientific organization of high standard or they must be certified by the boards of internal medicine, gastroenterology or surgery, and they must be recommended by two active members. In addition to the officers the following are charter members: Drs. Crawford F. Barnett, Atlanta, Ga.; James L. Borland, Jacksonville, Fla.; James B. Carey, Minneapolis; Allan L. Cohn, San Francisco; John H. Fitzgibbon, Portland, Ore.; Charles A. Flood, New York; John Tilden Howard, Baltimore; Roger H. Keane, Portland; Bruce D. Kenamore, St. Louis; Herman J. Moersch, Rochester, Minn.; Marie Ortmyer, Chicago; Roby John F. Renshaw, Cleveland; Leon Schiff, Cincinnati, and Roy L. Sexton, Washington, D. C. Applications for membership should be directed to Dr. Kirsner, 950 East Fifty-Ninth Street, Chicago.

LATIN AMERICA

Pan American Conference of Public Health.—The eleventh Pan American Conference of Public Health will be held in Rio de Janeiro during the present year, the exact date to be announced later. Members of the committee in charge of arrangements include Dr. João de Barros Barreto, president, and Raul Godinho, secretary.

Oscar de Souza Prize.—The Academia Nacional de Medicina of Rio de Janeiro will give two prizes equivalent in American money to \$1,000 and \$500 for the best article on "Applications of Index of Oxidase to Medicine." The papers should be sent to the secretary of the academy before April 30 with the proper name of the author and his identification enclosed in a sealed envelop. The prize was established in memory of the late Dr. Oscar de Souza of Rio de Janeiro, who for many years was a professor of physiology at the Academia Nacional de Medicina of Rio de Janeiro.

Foreign Letters

LONDON

(From Our Regular Correspondent)

Jan 24, 1942

Medical Students and the War

Medical students, like the rest of the population, are subject to conscription. The policy of the government has been to allow them to continue their studies and qualify, as the fighting forces make a large demand on the medical profession. Medical students, though pursuing their studies, are also made use of in the home defense forces either as combatants or as dressers. The present arrangements have given rise to correspondence in the *Times* from leaders of the profession. Dr A E Clark-Kennedy, dean of the medical school of the London Hospital, thinks that medical students should join the home guard (consisting of men mostly past military age who carry on their normal occupations and train for home defense in their spare time). In most units the students need train only on Sunday morning and on one evening during the week. Vacations could be devoted partly to reading and partly to military training. Sir Alfred Webb-Johnson, president of the Royal College of Surgeons, agrees and holds that the students should for the greater part of the year be under combined university and home guard discipline and that it is better that these able bodied young men should be trained to fight the enemy than be used as first aid parties. Sir Edward Graham-Little (dermatologist) describes the scheme adopted at St Mary's Hospital. The students are given lectures on first aid, anti gas measures and the use of weapons, and they form a unit which, while retaining its character and identity, has been incorporated into the home guard. Sir Edward gives the principles which have governed this experiment from its inception. 1 All medical students should undergo military training, thus anticipating by eighteen months the present national requirement. 2 The form of training should be decided by the stage which the student has reached. (a) junior students (preclinical) should form combatant units and be trained in the use of weapons, (b) senior students (clinical) should form medical units to be trained in first aid, hygiene and anti-gas measures, (c) students within one year of qualification, and therefore with some two years of medical and surgical training, should be used as clerks and dressers in the emergency medical service (for civilian casualties) if and when required. The success of the St Mary's Hospital experiment has led to its adoption by several other London hospitals. On the other hand, another correspondent argues that the medical student should be kept to his own department, as in case of military operations in this country there will be far greater shortage of medical personnel than of fighting men and any one with any surgical training whatever will be at a premium.

International Red Cross Conference on Treatment of War Prisoners

The International Red Cross is doing invaluable work for the relief of prisoners of war. Dr Karl J Burckhardt and Mlle Odier, International Red Cross delegates have come to this country to attend a meeting to discuss the treatment of prisoners of war and interned persons and the help that can be given to them. At a meeting in London they were introduced by Sir John Kennedy, joint director of the Foreign Relations Committee of the Red Cross. The International Red Cross Committee has obtained from several of the belligerents an agreement to apply to civilians the articles of the interna-

tional convention for the protection of prisoners of war of 1929. The work of the committee also includes a vast category of noninterned civilians, the victims of modern warfare. The problems of organizing help includes sea and land transport and the provision of additional lines of communication for a regular and equitable distribution of relief in food, clothing and medicaments and for intellectual needs. During 1940 the central agency for prisoners of war at Geneva dealt with an average of fifty thousand letters daily, and about six thousand families were informed each day of the fate of prisoners.

Dr Burckhardt said that the prison camps in Germany were visited regularly by delegates of the International Red Cross. Excellent work was done by the small fleet of International Red Cross ships at Lisbon, which carries parcels to Marseilles, whence they are dispatched to Geneva for the prison camps. Since the beginning of the war over two million parcels had been distributed.

The Diabetic Motorist

According to the law an applicant for a driving license must make a declaration as to whether he is suffering from any disease or disability which is specified on the form or from any which would be likely to cause his driving of a vehicle to be a danger to the public. If he does, the licensing authority must refuse him a license. An application was made by the police to the Belfast magistrates that a diabetic physician should be deprived of his driving license. They contended that the reactions to medical treatment rendered him unfit to have control of a car. But the physician to the biochemical department of the Royal Victoria Hospital gave evidence that, provided diabetes was properly controlled by insulin, there was no reason why the patient should suffer from insulin coma. The magistrate said that this was the first case of the kind in his experience. He refused the application of the police, which would, in effect, disqualify thousands of drivers who use the roads with as much safety as those who do not suffer from diabetes.

"Crush Syndrome" in Obstetrics

As reported in *THE JOURNAL*, June 28, 1941, page 2880, the bombing of our civilian population from the air led to the discovery of a new pathologic condition—renal failure after crushing of the limbs by fallen debris. In the *British Medical Journal*, Dec 20, 1941, page 887, James Young and John McMichael reported from the obstetric department of the British Postgraduate Medical School 2 cases of an apparently similar condition following the trauma of labor. A woman had a difficult labor lasting twenty-three hours. She rallied from the severe shock only to die eight hours later of renal failure, the blood urea reaching 388 mg per hundred cubic centimeters before death. The chief histologic lesions were found in the kidney and resembled those described in the cases of crushing by fallen debris—tubular degeneration with hemotogenous casts in the tubules. The second patient had oliguria after a difficult labor lasting fifty-eight hours, the blood urea reading being 79 mg per hundred cubic centimeters. There was no shock, and recovery was rapid.

These cases suggest a condition in obstetric practice apparently heretofore unrecognized. As it is evidently rare, there is need for concerted study in obstetric centers. The question arises whether it throws any light on the baffling problem of "obstetric shock" in which trauma of the pelvic soft parts plays an important part. Some obstetricians hold that obstetric shock is due to flooding of the circulation with toxic elements from the crushed tissues. A Medical Research Council sub-committee has been set up to coordinate research on the crush syndrome and invites the sending of any available data.

PALESTINE

(From Our Regular Correspondent)

Jan. 23, 1942.

In Wartime

The transition from peace to war was not difficult for the inhabitants of Palestine, notwithstanding the fact that the Middle East was one of the main objectives of the enemy. On the one hand, on the outbreak of the second world war the people of this country were in the midst of a partisan war for some three years (1936-1939) as a result of the riots, which had a derogatory effect on the economic life of the Jewish population and almost completely destroyed the economic structure of the Arab inhabitants. On the other hand, at the time of the outbreak of hostilities the Middle East was still removed from the actual battle zone, and the appearance of a common foe settled the dispute between the two nations in the country. An unconditional truce was the result, and the economic and social life was resumed on a much wider scale.

Once again the physician was the first to experience the improved condition, just as he is the first to be affected by adverse circumstances.

Arab patients, who for years did not dare to visit the Jewish physician in the neighboring village, owing to the internal terrorism which reigned among the Arab population, flocked to him with their complaints. The Arab worker appeared on the labor market and in the Jewish groves and, most important of all, the Arab farmer once again found a good market for the vegetables, eggs and other produce of his primitive farm.

MEDICAL SUPPLIES

One of the main problems of the country was the question of supply. A country dependent to a great extent on imports cannot remain calm during wartime, when the question of sea transport and shipping space is of utmost importance. Palestine's main export product—citrus fruit—could not be sent to foreign markets, thus causing a crisis in the citrus industry and a formidable state of unemployment in the citrus settlements. For our requirements of medicaments we were also dependent almost entirely on imports. Action was therefore needed in three different directions: (a) preparation of sufficient stocks of medicaments, surgical bandages, x-ray films, serums; (b) intensified local production; (c) maximum economy. It is gratifying to record that success was attained on all three points.

Until Italy's entry into the war and while some of the European countries still remained unmolested, we were able to concentrate on medical supplies. However, as time passed, one after another the countries fell victim to the enemy—Finland, Norway, the Netherlands, Denmark, Belgium and France—and although the seas stayed free and for many months after the fall of these countries we received our orders, we knew they were the last we would receive. With the entrance of Italy into the war, only two countries were left as possible sources of supply: the United Kingdom and the United States of America. Conditions became more acute and the supply position became more difficult from day to day. Execution of an order from the day it was placed and until receipt of the goods took from eight to fourteen months. The position was even more serious in connection with medicines whose period of efficacy is limited, such as insulin, protamine zinc insulin, serums and x-ray films. We were faced with problems never known before. Once we valued the ampule because of its contents, now it is the empty ampule that is of most value. For example if, say we have a sufficient stock of morphine in substance, it is feared that we may not, in future, have the empty ampule for refilling with morphine, or whether we shall have the syringe and needle for the injection. The few instances given prove the necessity to adhere to the other points mentioned: intensive local production and maximum economy.

As conditions became grave, the country was already in such a state of intensive local production in all branches of industry and manufacture, including that of medical supplies, as to be of aid not only to the civilian population but also to the military authorities. The medical man derived a certain measure of comfort from the thought that there were ample supplies not only of locally brewed beer, fresh eggs, milk and butter—required also by the military hospitals—but, in the main, from the fact that locally manufactured cotton wool, bandages, and so on, could be obtained.

A project for the establishment of an institute for the production of various serums is now under consideration by the Jewish community.

Those of the inhabitants of this country who went through the last world war and remember the poverty which prevailed throughout Palestine and the absolute dependence of the country on the outside world for all the needs of life, especially in the field of medicine, can appreciate the present state of the local population in the agricultural and industrial domains and, to no little extent, in the field of medicine.

AERIAL BOMBARDMENTS

Italy's entry into the war, the Libyan campaigns and the conquest of Syria by the Allied forces converted Palestine into a battlefield. The blackout brought many accidents on the roads which the military traffic serves to enlarge by day as well as by night. The numerous air raid alarms, even when no actual raid follows, have derogatory effects on the health of the population, although comparatively slight. In this totalitarian war with an enemy who makes no distinction between the soldier in battle and the baby reposing in its cradle, the condition of the civilian population is often worse than that of the soldier. Haifa is a port town where heavy industry is concentrated; although it has been repeatedly bombed, the number of its victims was comparatively small, as, with the approach of enemy planes, antiaircraft batteries go into action. Over an open town, where there are no antiaircraft guns, the planes linger over the town, choose their targets and release their load of bombs without themselves incurring any danger. The bombing of Tel-Aviv is proof of this. Tel-Aviv was bombed twice, once in the afternoon and once at night. The total number of victims caused by the first raid was one hundred and twenty-one and by the second raid thirteen. On Sept. 9, 1940 the one hundred and eighty thousand inhabitants of Tel-Aviv were pursuing their daily activities without suspecting anything about to happen. Suddenly bombs rained on the town for approximately one minute and fell in the main streets, thronged with people, causing the death of fifty-seven men, forty-four women and twenty children. In the second raid, on June 12, 1941, an Invalids' Home was completely demolished at a time when the inmates could not descend to the shelter, owing to their feebleness. The number of victims was four men and nine women.

KUPAT HOLIM, THE SICK FUND OF THE GENERAL
FEDERATION OF JEWISH LABOR

Kupat Holim cares for the health of two hundred thousand people and has at its disposal two hospitals, convalescent homes, dispensaries in two hundred and forty branches throughout the country, in the town as well as in the most remote and small agricultural settlements. With its three hundred and fifty physicians, two hundred and fifty nurses, a large number of pharmacists and dental surgeons, with its own pharmacies in every town and village, and with a central supply store, x-ray institutes, diagnostic and physical therapeutic clinics during riots and in wartime it is incumbent on such an institution to fulfill manifold duties not only on behalf of its members but for the whole populace. During aerial bombardments, the dispensaries of Kupat Holim are the natural place to which the wounded

come for first aid. In many of the settlements, Kupat Holim dispensaries are the only ones where first aid can be given. Such dispensaries are therefore supplied with a stock of dressings and medicaments. All the physicians and nurses of Kupat Holim always stand by to tender first aid in the dispensaries, which are considered also as first aid posts. In every rural area there is a central dispensary with up to date equipment and with specialists on its staff, where the sick and wounded are brought for more serious treatment or if it is necessary to have a medical consultation.

The two Kupat Holim hospitals serve as reserve for the admittance of wounded in the event of a heavy raid. Both hospitals are situated in rural districts and are not so easy a target as the town hospitals. The Hadassah hospital is on Mount Scopus, Jerusalem, and we still delude ourselves that this town, holy to all the races and creeds, even a totalitarian foe will not dare to attack. The second Kupat Holim hospital is situated on a hillock in the center of the Jezreel Valley and, although it has only eighty beds, accommodation for one hundred additional persons was prepared by outfitting a neighboring school as a hospital. Five thousand dollars was invested for this purpose by Hadassah and the Vaad Leumi. This central hospital at Afuleh is intended mainly for the wounded of Haifa, in case there will be need to transfer patients from the hospitals of that town to a safer locality. The hospital in question has modern equipment and facilities for any operation which may be required. The Kupat Holim Convalescent home on Mount Carmel, Haifa, is also intended to serve as a reserve for the wounded of Haifa. Another Kupat Holim convalescent home at Arzo, near Jerusalem, is to serve, as all hospitals in Jerusalem, for use in case of evacuation or the transfer of patients from bombed areas, especially Tel-Aviv.

AUSTRALIA

(From Our Regular Correspondent)

Dec. 26, 1941.

Australia Sends Medical Aid to Russia

Medical supplies to the value of many thousands of pounds have already been sent to Russia from Australia. They will be available either for military or for civilian use. Russian authorities have provided a list of medical supplies which they require from external sources. An exportable surplus of a number of these supplies is available in Australia. Money collected in appeals for monetary aid to Russia will be used in other countries to purchase supplies which cannot be supplied from Australia.

The Commonwealth Serum Laboratories

Among the industrial and scientific establishments which have become essential to Australia's war organization are the Commonwealth Serum Laboratories at Royal Park, Melbourne, which are the largest of their kind in the Southern Hemisphere. Since the outbreak of war they have been working at high speed in supplying serums, vaccines and other biologic products for the fighting services and the civil community, and they now manufacture almost the whole range of biologic products. For some time the laboratories have been capable of supplying the needs of Australia and its fighting forces overseas, and recently they were extended to enable them to relieve the United Kingdom of the task of supplying such products to other British possessions bordering the Pacific and Indian oceans and friendly non-British powers. The serum laboratories were established in the early days of the first world war to meet an emergency caused by the cessation of supplies of serum and vaccines from overseas. A staff of about three hundred, consisting of graduates of human and veterinary medicine, specially trained in bacteriology and pathology, and highly skilled biochemists, physicists and botanists, is conducting brilliant research into

every relevant aspect of bacteriology and immunology. As the growth of medical knowledge opens up new fields of treatment, prevention and diagnosis, new serums and prophylactic agents are being tested. The live stock population of the laboratories totals many thousands of guinea pigs, rabbits, mice, rats, horses, cattle, sheep, dogs, donkeys and bandicoots.

These laboratories are unaffected by constitutional limitations which restrict commonwealth action in other phases of public health control in Australia, and in their twenty-five years of existence they have shown a record of steady development, high scientific attainment and commercial success conspicuous among government institutions. They now play a part in Australia's national economy for which there is no substitute. The volume of business has steadily increased, and the growing profits are paid into a trust account. It is the policy, however, first to pass on to the public the benefit by way of reduced prices for products and, second, to extend the facilities for research into some of the obscure aspects of this branch of medical treatment. Results have been most encouraging and have proved beyond doubt the wisdom and soundness of this policy. It has always been the aim of the laboratories to supply only agents of proved value, uniform in potency and standardized according to the best technic available. The laboratories have been appointed the national center for the maintenance in Australia of the standards of the Permanent Commission on Biological Standardization of the League of Nations.

SERUM PRODUCTS

The department responsible for the production of insulin used in the treatment of diabetes has steadily grown, and the amount of insulin now being regularly issued is very large. Commonwealth solution of pituitary is now well established among the practicing profession as a sound therapeutic agent, and supplies of the commonwealth subsidiary standard of pituitary are regularly renewed and checked against the international standard. Thyroid tablets are produced and standardized in terms of thyroxine iodine in accordance with the recommendations of the British Pharmacopeia. Although the local demand for jennierian calf lymph for vaccination against smallpox is not great, adequate supplies are constantly maintained in a readily available form to meet any possible epidemic emergency. The vaccine department of the laboratories produces a wide range of vaccines for prevention or treatment of such diseases as cholera and plague, dysentery, gonorrhea, influenza, whooping cough, typhoid and coryza and the streptococcal and staphylococcal infections. In addition, this department makes special vaccines to prescriptions. Separate departments produce diphtheria and tetanus toxins and also toxoids. The latter are used for the prevention of these diseases in human beings and animals. A special anaerobic department prepares toxin for the production of gas gangrene antitoxin and other serums. In other departments, serums are prepared for treatment of many other diseases, including anthrax, dysentery, gonorrhea, cerebrospinal meningitis, gas gangrene and pneumonia.

Part of the laboratories were recently rebuilt and specially equipped for the investigation of vitamins. High grade spectro-photographic and other apparatus are used.

Antivenins for the treatment of snakebite of the Australian venomous snakes have been the subject of intensive investigation for the last ten years, and antivenene is now available for the most poisonous of the Australian snakes. A large range of tuberculins is prepared by a special department from human and bovine strains of *Mycobacterium tuberculosis* for the diagnosis of tuberculosis in human beings and animals. Other preparations from similar organisms are also available. In the allergen department a large number of special extracts for testing and treatment of hay fever and asthma are prepared. These are derived from such diverse sources as grass and other

plant pollens, animal hair, dandruff, many foods and miscellaneous substances such as house dust, orris root and insect bodies. The medium department supplies several hundred different types of bacteriologic medium for use by bacteriologists within the serum laboratories and in the special departments of hospitals and other institutions throughout Australia. Another special department prepares various agents for the diagnosis of disease as used in the practice of human and veterinary medicine by pathologic departments of hospitals. Although, for the last fifteen years, the production of veterinary biologic products has been a feature of the work of the laboratories, there has been an extensive development in this direction more recently. The products have been used in greatly increased amounts in all states for the prevention or treatment of disease in domestic animals due to black disease, botulism, tetanus, enterotoxemia, blackleg, canine distemper and canine tick poisoning. The care and treatment of many thousands of animals is the responsibility of the veterinary staff.

OTHER ACTIVITIES

It would be a misconception to regard the serum laboratories as an institute solely devoted to the preparation and distribution of biologic products. A large portion of the work consists in activities other than production as already indicated. The laboratories do much work as part of the commonwealth department of health, exercising advisory, investigative and routine functions in a special capacity. In addition, regular annual examinations are held for several grades of officers in the department. These are compulsory for all these grades throughout the health service. The Commonwealth Serum Laboratories combine scientific achievement with commercial enterprise in an institution which serves Australia well in time of peace. In time of national emergency—such as the present—it provides a service vital to the civil population and the fighting services as well as to those units of the empire and allied nations dependent on Australia in this respect.

Scheme for National Medical Service in Australia

The National Health and Medical Research Council has prepared a scheme for a salaried medical service throughout Australia. More than £13,000,000 a year would be needed for the scheme. Against this amount the council claims that Australia's four thousand doctors are paid well over £8,000,000 a year. This total includes more than £7,000,000 paid by the public, £864,341 by friendly societies, and £1,000,000 under the national insurance act. Under the scheme, medical care would be coordinated for the benefit of the patient while safeguarding the free choice of doctors, thus minimizing the overlapping caused by professional competition and pooling professional knowledge. General practice would be returned to the general practitioner as far as possible. Specialist, consultant and auxiliary services would be made as widely accessible as possible, and there would be a better distribution of medical men in terms of medical needs.

The scheme provides for improving existing medical facilities in many ways, by making services available to all people of any income, by regulating distribution of doctors, by bringing preventive and curative services into an organic union and by increasing opportunities for productive research. There would be coordination of protective health services with the correct provision for medical care. Outpost and remote areas which at present cannot support a doctor would come into a grouping under which salaried personnel would be evenly distributed. Medical practitioners would be relieved of the present handicap of their "twenty-four hours a day accessibility" and would be ensured adequate remuneration for their services. All forms of hospital and institutional services would be extended and developed under the scheme.

The outline for national salaried medical service is necessarily only tentative at present. Governments could not adopt the principles advanced until some general estimates of the financial charges and commitments have been supplied. Realizing this, the council has elaborated the scheme along technical lines to incorporate general costs in all states. The council has not offered any suggestion as to the manner in which the service recommended should be paid for by the public, although it recognizes that some form of direct or indirect taxation seems inevitable. Compulsory insurance for all people receiving £416 or less a year has been suggested by the British Medical Association. This would bring them within reach of such a national service. The council considers that, whatever scheme is ultimately accepted, it should be one freely available to all the people of the commonwealth.

Criticism of Housing Conditions

Addressing the thirtieth annual conference of health inspectors in New South Wales the minister for health (Mr. Kelly) delivered a trenchant criticism of housing conditions, which he said causes much of the ill health of our community. Criticism was also made of the modern type of block flats erected in the city area. Many of these flats consist of little cubicles with smaller cubicles attached for kitchen purposes and for bathing and sanitation. They are a menace to health and must eventually develop into slums. Increase in the number of flat dwellers and the habit which has arisen of converting larger homes into a group of several smaller flats, often with the help of a veranda walled in to make extra rooms, has led to parliamentary action which requires that in any new house no room shall be built which has not at least one wall facing to the exterior. While this may be desirable as a means of eliminating badly illuminated, badly ventilated inside rooms, it has a disadvantage in tropical areas in that it does not allow home makers the protection of wide verandas against the summer heat and glare. A more direct control of the housing problem is needed.

Tuberculin Tests for Militia

The testing of members of the militia (home defense) forces in Australia for tuberculosis has now begun. X-ray examinations are being made similarly to those for members of the Australian imperial force and apply to eighty thousand members engaged in military duties for the duration of the war.

Honor for John Flynn

The Right Rev. John Flynn, founder and superintendent of the Australian Inland Mission, has received the degree of Doctor of Divinity, conferred by the Presbyterian College of the McGill University, Toronto. "Flynn of the Inland" was virtually responsible for founding the Flying Doctor services for the Australian "out back."

Marriages

JESSE MARTIN KIRBY to Miss Florence L. Rucks, both of Little Rock, Ark., in Charleston, W. Va., Nov. 8, 1941.

BARRON DWINELL KNOX, Holyoke, Mass., to Miss Jane Webb Bratton at Washington, D. C., Dec. 7, 1941.

JAMES TATE MASON JR., Bellevue, Wash., to Miss Margaret Elisabeth Thomas at Bluefield, W. Va., January 10.

ABRAHAM HYMAN RUSSAKOFF to Miss Irene Gertrude Lewis, both of Baltimore, Nov. 28, 1941.

CHARLES ARTHUR GLENN to DR. DOROTHY NORMAN, both of Gastonia, N. C., recently.

EDWARD PAUL SHERIDEN, Summer, Ill., to Miss June Russell of Harvey in January.

Deaths

Rock Sleyster ☉ President of the American Medical Association, 1939-1940, died, March 7, at his home in Wauwatosa, Wis., aged 62, of heart disease. Dr. Sleyster was born in Waupun, Wis., June 14, 1879. After graduation from the College of Physicians and Surgeons of Chicago, School of Medicine of the University of Illinois, in 1902 he entered the practice of medicine. He became secretary of the Calumet County Medical Society in 1903, continuing for six years, and was thereafter continuously associated with organized medicine. He was elected assistant secretary of the State Medical Society of Wisconsin in 1910 and served until 1914, when he became secretary. This position he occupied until elected president in 1924. In 1925 he was made treasurer of the society, serving for many years. From 1918 to 1923 Dr. Sleyster was editor of the *Wisconsin Medical Journal*.

In 1913 and 1914 and from 1918 to 1926 he served as delegate to the American Medical Association and during the last four years of that period was Vice Speaker of the House of Delegates. He became a Trustee of the American Medical Association in 1926 and served continuously until 1937, acting as Chairman of the Board from 1935 to 1937.

Dr. Sleyster first practiced medicine at Kiel and Appleton, Wis. Then he became physician to the prison for the criminal insane at Waupun, Wis., where he did research, much of which was published. He was medical director of the Central State Hospital for Insane, Waupun, from 1909 to 1919, when he resigned to become medical director of the Milwaukee Sanitarium, Wauwatosa.

During the World War Dr. Sleyster was a major in the United States Army Medical Corps and was appointed medical aide to the governor of Wisconsin. From 1916 to 1920 he served as chief of the Bureau of Post-Graduate Medical Instruction at the University of Wisconsin Extension Division. He was a fellow and a member of the board of governors of the American College of Physicians and a member of the American Psychiatric Association, the Association for Research in Nervous and Mental Diseases and the Central Neuropsychiatric Association.

Dr. Sleyster was devoted to the service of his profession and to its members. He gave freely of his time and worked many extra hours both day and night for the advancement of medical organization. He was gentle, modest, thoughtful and altogether a most cultured and genial gentleman.

Lawrence Joseph Henderson, Cambridge, Mass.; Harvard Medical School, Boston, 1902; lecturer on biological chemistry, 1904-1905, an instructor from 1905 to 1910, assistant professor from 1910 to 1919, professor from 1919 to 1934, and since 1934 Abbott and James Lawrence professor of chemistry at his alma mater; director of the Fatigue Laboratory at Harvard Business School since it was established in 1927 and chairman of the Society of Fellows at Harvard University since it was founded in 1933; in 1921 served as exchange professor at the University of Paris, France, in 1928 Silliman lecturer at Yale University, New Haven, Conn., and in the same year Leyden lecturer at the University of Berlin, Germany; in 1931 Mills Lecturer at the University of California, Berkeley; foreign secretary of the National Academy of Sciences and a fellow of the American Academy of Arts and Sciences;

member of the Association of American Physicians, American Physiological Society, American Society of Biological Chemists, American Chemical Society and the American Philosophical Society; corresponding member of the Académie de médecine, Paris; member of the Legion of Honor of France; author of "The Fitness of the Environment," 1913, "The Order of Nature," 1917, "Blood," 1928, and "Pareto's Sociology," 1935; was awarded the honorary degree of doctor of science by Harvard University in 1932 and the University of Cambridge, England, in 1934; aged 63; died, February 10, in the Phillips House of the Massachusetts General Hospital, Boston.

John McHale Dean ☉ St. Louis; Washington University School of Medicine, St. Louis, 1896; assistant in anatomy at his alma mater, 1897-1898; instructor in surgery, St. Louis University School of Medicine, from 1903 to 1911, assistant professor from 1911 to 1921 and later associate professor of surgery; assistant superintendent, St. Louis City Hospital, 1898-1899; visiting surgeon, St. Anthony's Hospital, from 1900 to 1909; chief surgeon on the staff of St. Mary's Infirmary from 1909 to 1924 and on the staff of the Mount St. Rose Sanatorium during the same period; since 1924 surgeon to St. John's Hospital; served during the World War; aged 66; died, Dec. 8, 1941.

Virginus Dabney, Washington, D. C.; University of Virginia Department of Medicine, Charlottesville, 1902; at one time professor of laryngology and otology at the George Washington University School of Medicine; member of the American Laryngological Association; fellow of the American College of Surgeons; formerly otolaryngologist to the Garfield Memorial Hospital and the Washington Orphan Asylum; surgeon, Episcopal Eye, Ear and Throat Hospital, and laryngologist to the George Washington University Hospital; formerly surgeon for the police and fire departments; aged 63; died, January 18, in the Emergency Hospital of coronary disease.

Leslie Frederick MacDiarmid ☉ Chicago; College of Physicians and Surgeons of Chicago, School of Medicine of the University of Illinois, 1909; formerly professor of therapeutics at the Loyola University School of Medicine; fellow of the American College of Surgeons; member of the surgical staff of the Garfield Park Hospital; attending surgeon at the University Hospital; aged 57; died, January 20, at his home in Oak Park, Ill., of acute dilatation of the heart.

Richard Clyde Lowry, Oklahoma City; University of Oklahoma School of Medicine, Oklahoma City, 1916; professor of clinical obstetrics at his alma mater; member of the Central Association of Obstetricians and Gynecologists; fellow of the American College of Surgeons; member of the staffs of the State University and Crippled Children's Hospital, St. Anthony Hospital and the Wesley Hospital; aged 50; died, Dec. 2, 1941, of coronary occlusion.

Benjamin Edgar Miller, New Smyrna Beach, Fla.; College of Physicians and Surgeons, Baltimore, 1892; member of the Florida Medical Association; past president of the Volusia County Medical Society and the Tattall-Evans County (Ga.) Medical Society; for many years chairman of the board of trustees of the Claxton (Ga.) schools and trustee of the Brewton Parker Junior College, Mount Vernon, Ga.; aged 70; died, Dec. 21, 1941.

Truman E. Loope Jr., Iola, Wis.; Rush Medical College, Chicago, 1894; past president of the Waupaca County Medical Society; trustee of the village of Iola from 1901 to 1905 and



ROCK SLEYSTER, M.D., 1879-1942

from 1912 to 1916 and president from 1906 to 1908; formerly health officer; formerly director of the school board; aged 71; died, Dec. 6, 1941, of myocarditis.

Francis Joseph Cahill, Hoosick Falls, N. Y.; Cornell University Medical College, New York, 1906; member of the Medical Society of the State of New York; served during the World War; health officer of the town and village of Hoosick Falls; aged 63; died, January 6, of coronary thrombosis.

Robert Eyris Bley @ Bunker Hill, Ill.; Jefferson Medical College of Philadelphia, 1910; past president of the Macoupin County Medical Society; served during the World War; aged 54; died, January 18, in the Alton (Ill.) Memorial Hospital of carcinoma of the lung with metastases to the brain.

Charles E. B. Flagg, Vancouver, Wash.; University of Georgia Medical Department, Augusta, 1890; member of the Washington State Medical Association; veteran of the Spanish-American and World wars; served in the Philippines during the China insurrection; aged 71; died, Dec. 6, 1941.

Fred Hercules Bell, Baldwin City, Kan.; University Medical College of Kansas City, Mo., 1905; member of the Kansas Medical Society; physician for the county board of selective service; served during the World War; aged 60; died, January 7, of coronary thrombosis.

Charles Boarman Harris, Pembina, N. D.; College of Physicians and Surgeons, Baltimore, 1880; member of the North Dakota State Medical Association; served on the city and county health boards; aged 84; died, January 2, of arteriosclerosis and heart disease.

Clarence Taylor Fowler, Dexter, N. Y.; Syracuse University College of Medicine, 1907; member of the Medical Society of the State of New York; health officer; aged 58; died, Dec. 29, 1941, in the Mercy Hospital, Watertown, of coronary thrombosis.

Howard Burnett Speer, Stamford, Conn.; Long Island College Hospital, Brooklyn, 1893; formerly assistant medical director of the Metropolitan Life Insurance Company, New York; aged 71; died, January 2, in Toronto, Ont., Canada, of heart disease.

George Millward Brewer, Plumsteadville, Pa.; University of Maryland School of Medicine, Baltimore, 1910; member of the Medical Society of the State of Pennsylvania; aged 56; died, January 11, in St. Petersburg, Fla., of cerebral hemorrhage.

Heman Bangs Andrew, Newark, N. J.; University of the City of New York Medical Department, 1878; aged 88; died, January 14, in the Hospital of St. Barnabas and for Women and Children of arteriosclerotic heart disease and hypertrophic prostatitis.

Otis P. Hamilton @ Forrest, Ill.; Illinois Medical College, Chicago, 1907; past president of the Livingston County Medical Society; served during the World War; aged 59; died, January 19, of cerebral hemorrhage, hypertension and coronary sclerosis.

Raymond Edmund Doering, Minneapolis; St. Louis University School of Medicine, 1924; member of the Minnesota State Medical Association; aged 47; died, January 13, of abdominal carcinomatosis with pulmonary metastasis.

James F. Chvatil, Berwyn, Ill.; Rush Medical College, Chicago, 1893; member of the Illinois State Medical Society; on the staff of Hospital of St. Anthony de Padua, Chicago; aged 76; died, January 27, in Chicago of nephritis.

George Charles Anderson, Pittsburgh; Western Pennsylvania Medical College, Pittsburgh, 1903; member of the Medical Society of the State of Pennsylvania; aged 66; died, January 1, of angina pectoris and arteriosclerosis.

James D. Byrns, Mitchell, Ind.; Louisville (Ky.) Medical College, 1894; past president of the Lawrence County Medical Society; health officer; aged 71; died, January 18, in the Dunn Hospital, Bedford, of carcinoma of the liver.

Wade Kisinger Chamberlin, Tiffin, Ohio; Cleveland Medical College, 1895; member of the Ohio State Medical Association; served during the World War; aged 71; died, January 6, of diverticulitis of the colon.

Eleanor Frances Martin, Pasadena, Calif.; Hahnemann Hospital College of San Francisco, 1892; aged 74; died, January 2, in the Huntington Memorial Hospital of a fractured hip and tuberculosis of the cecum.

Cora Clementine Bash, Peiping, China; Woman's Medical College of Pennsylvania, Philadelphia, 1911; medical missionary; superintendent of the Douw Hospital; aged 59; died, Dec. 23, 1941, of endocarditis.

William Edward Gault, Portsmouth, Ohio; Pulte Medical College, Cincinnati, 1897; member of the Ohio State Medical Association; served during the World War; aged 73; died, January 5, of heart disease.

John W. Kremer, Louisville, Ky.; Hospital College of Medicine, Louisville, 1897; member of the Kentucky State Medical Association; aged 72; died, January 1, in St. Anthony's Hospital of heart disease.

Henry Lee Banks, Hannibal, Mo.; St. Louis Medical College, 1890; member of the Missouri State Medical Association; aged 77; on the staff of the Levering Hospital, where he died, January 10, of uremia.

George W. R. Smith, Mesilla Park, N. M.; Arkansas Industrial University Medical Department, Little Rock, 1891; aged 74; died, Dec. 13, 1941, in Berkeley, Calif., of angina pectoris and uremia.

James Alexander Collins, Birmingham, Ala.; Louisville (Ky.) Medical College, 1891; member of the Medical Association of the State of Alabama; aged 72; died in November 1941 of myocarditis.

Gray Chandler Briggs, St. Louis; St. Louis College of Physicians and Surgeons, 1909; served during the World War; aged 59; died, January 23, in the Missouri Baptist Hospital of lobar pneumonia.

Daniel Paul Gillespie, New York; University and Bellevue Hospital Medical College, New York, 1906; member of the Medical Society of the State of New York; aged 69; died, Nov. 28, 1941.

Paul Elliott Beach, Cleveland; University of Wooster Medical Department, Cleveland, 1912; on the visiting staff of St. Luke's Hospital; aged 56; died, January 17, of coronary thrombosis.

Joseph Floyd Hager, Chattanooga, Tenn.; Chattanooga Medical College, 1910; at one time mayor of Alton Park; aged 63; died, January 4, of coronary heart disease and chronic nephritis.

Gordon T. Atkinson, Crisfield, Md.; University of Pennsylvania Department of Medicine, Philadelphia, 1869; at one time bank president; aged 95; died, January 14, of arteriosclerosis.

Clara Susan Hampson, East Orange, N. J.; Eclectic Medical College of the City of New York, 1888; aged 85; died, Dec. 18, 1941, in the Orange (N. J.) Memorial Hospital.

Arnold Theodore Droste @ Detroit; Detroit College of Medicine and Surgery, 1924; aged 48; died, January 12, in the Marr General Hospital of cirrhosis of the liver.

Joseph Wilson Darrach, Martins Ferry, Ohio; Western Reserve University Medical Department, Cleveland, 1882; aged 83; died, January 3, of cerebral hemorrhage.

Arthur I. Brown, Cleveland; Western Reserve University Medical Department, Cleveland, 1893; also a dentist; aged 69; died, January 11, of coronary embolism.

Henry Fuller Rathbun, Mexico City, Mexico; University and Bellevue Hospital Medical College, New York, 1906; aged 61; died, Nov. 14, 1941, in Los Angeles.

John Wesley Story, Perry, Ga.; Kentucky School of Medicine, Louisville, 1893; member of the Medical Association of Georgia; aged 70; died, Nov. 4, 1941.

George Wing Dryer, Moline, Ill.; Harvard Medical School, Boston, 1931; aged 37; died, January 12, of ruptured varicosity at the cardiac end of the stomach.

Thomas J. Brown, Glenford, Ohio; University of Tennessee Medical Department, Nashville, Tenn., 1890; aged 77; died, January 11, of heart disease.

Daniel Rufus Kneecze, Pelion, S. C.; University of Georgia Medical Department, Augusta, 1887; aged 82; died, January 17, of cerebral hemorrhage.

John Andrew Settle, McAlester, Okla. (licensed in Oklahoma under the Act of 1908); aged 64; died, Nov. 13, 1941, of arteriosclerosis.

Ernest G. Earnheart, Oklahoma City; Missouri Medical College, St. Louis, 1899; aged 68; died, February 21, of coronary thrombosis.

James Newton Thomas, Lucasville, Ohio; Miami Medical College, Cincinnati, 1891; aged 77; died in November 1941.

Leland Le Grand Fillmore, Los Angeles; Albany (N. Y.) Medical College, 1896; aged 67; died, Nov. 8, 1941.

Mindia Phelps Sears, Carpinteria, Calif.; Cleveland Medical College, 1897; aged 74; died, Dec. 31, 1941.

Correspondence

STREPTOCOCCUS VIRIDANS SEPTICEMIA

To the Editor—The January 31 issue of THE JOURNAL contains a clinical note, "Streptococcus Viridans Septicemia A Cure with Sulfapyridine," by Drs G B Moore Jr and A J Tannenbaum of Camp Claiborne, Louisiana. The title is unfortunate, since it implies that infections produced by the usual etiologic agent in cases of subacute bacterial endocarditis can be controlled by sulfapyridine. As a matter of fact, little if any evidence has been presented concerning the effectiveness of the sulfonamides in cases of subacute bacterial endocarditis caused by Streptococcus viridans.

The difficulty appears to arise from the classification of the streptococcus, since not all the streptococci that produce so called alpha hemolysis on blood agar plates are Streptococcus viridans. A true Streptococcus viridans produces a pinpoint colony that is surrounded by a narrow zone of greenish discoloration (alpha hemolysis), whereas by far the majority of alpha hemolytic streptococci have much larger colonies that are surrounded by relatively wide zones of greenish discoloration, often including halos of true hemolysis. The latter are always present in the normal secretions of the nose and mouth and in the nasal discharges and sputum in cases of infection of the upper respiratory tract. Furthermore, at the Boston City Hospital they have often been recovered from blood cultures taken from patients with tonsillar infections, puerperal sepsis and other acute infections. Their presence does not indicate a hopeless prognosis—in fact, by far the majority of patients recover—and as a rule there is no suggestion of endocarditis. In other words, I venture to suggest that the organism recovered from Drs Moore and Tannenbaum's patient was not Streptococcus viridans but one of the other alpha hemolytic streptococci. If this is so, the corollary, of course, is that one should not expect to cure a patient with subacute bacterial endocarditis due to Streptococcus viridans by the use of sulfapyridine.

ROBERT N NAY, M D, Boston

THE ORR METHOD FOR WOUNDS AND COMPOUND FRACTURES

To the Editor—Because of many inquiries and some misunderstanding I should like to explain certain points with regard to the Orr method for wounds and compound fractures.

A "Wide World" dispatch this morning from Kuibyshev stated that a modernized method of the Russian surgeon Pirogov is the one now being employed among the Russian troops for the treatment of gunshot wounds and fractures. It is said that 'a tight plaster of paris casts are a factor in the treatment. Similar statements about tight casts and foul smelling dressings have delayed the general acceptance of the program that I have been advocating. The surgical treatment program that I have been recommending for twenty years is immediate replacement of injured parts in correct position, open drainage of infected wounds, immobilization of the extremities in plaster of paris casts and infrequent dressing to protect against secondary infection. These are all essential for good surgery in either military or civil practice.

With regard to the tight fitting casts, I have stated repeatedly that casts without padding are not suitable for general employment. It is much better to maintain length and correct position as well as immobilization, by means of skeletal fixation with the pins embedded in the plaster of paris cast. This will avoid constriction or pressure in these important immobilizing dressings.

Trueta, whose name has often been connected with this method because of his fine work in Barcelona, has always recognized these points in his use of this method.

The Russian surgeon Pirogov, who is mentioned in today's message from Kuibyshev, was a military surgeon in the Caucasus and in the Crimea in 1854. He made many important contributions to surgical methods and to both military and civil practice. His exact relationship to this method is shown in letters that I had from Leningrad some years ago.

Professor S Novotel'nov of the famous clinic of Professor Turner in Leningrad, wrote to me on March 28, 1933 as follows:

My dear Professor Orr, I have received your kind letter dated the 10th of February, and the booklets and reprints, for which I am very much obliged to you. I communicated my contentment to Professor Turner, and he was delighted with your extreme kindness. My works on the osteomyelitis treatment according to your method are advancing. Before publication I expect, if possible, the complete recovery of all the patients on whom I have operated this year.

The comparison between the results of the Orr method and the results of other methods of treatment in which I have an experience of twenty years, and on which I have printed works, gives me the right to expose the following considerations. Having accomplished a revolution and established a new era [by the Lister antiseptic method], surgery has later changed by means of evolution into physical antiseptics, which is the foundation of the rational modern method of wound treatment. That the ideas of physical antiseptics were in the air [some time ago] is to be seen in the doctrines of another surgeon of genius belonging to that epoch, N. I. Pirogov. As early as the year 1865 he considered as evident the merits of a good drainage and of a well absorbing dressing material for the protection and cleansing of wounds, and, on the other hand, Pirogov says that "immobilization is an important factor for wound treatment." In another place Pirogov is saying "A plaster bandage may be ranked not only among the palliative means but also among those preventing inflammation."

Professor Novotel'nov further says:

The demands of Orr are an extensive drainage and a pedantic cleansing from sequestrums and necrotic bone tissues and the formation of an extensive outlet of the bony trough. These have always been the requirements of rational practical surgery. To safeguard the wound from irritation and secondary infection, Orr wishes to use a drainage petrolatum gauze plug. The same is to be said concerning the keeping of a dressing for a long time on an infected wound by Pirogov and even by Larrey, Napoleon's surgeon in 1812. Larrey sometimes did not change his dressings for as much as eight days, although in that time worms were already crawling on them.

This is the historical account which gave rise to the suggestion in 1930 that maggots might actually contribute to the healing of wounds. Needless to say, the use of maggots for treatment has now proved to be untenable.

Writing to me again from Leningrad in 1936 on the 18th of April Professor Novotel'nov said:

I am very glad to hear that your method has found such a widespread application in the different countries of the world. After the publication of my articles here recommending your method many surgeons practically realized the value of it, as for example Professor Burdenko of Moscow and Professor Fridland of Khasan and others.

Dr Novotel'nov accepted my invitation to attend the meeting of the American Orthopedic Association in Lincoln in 1937 but was unable to make the journey. Any one who reads my papers on this subject will remember that I have made numerous acknowledgments to John Hilton, Lord Lister, Hugh Owen Thomas, Dr John Ridlon of Chicago and others for their teachings as to the importance of restoration of correct position, immobilization in plaster of paris casts and infrequent dressings. It is this program of good surgery from beginning to end that constitutes the method. That other surgeons have made suggestions along this line during the history of surgery goes without saying. Pirogov was a great surgeon, perhaps the greatest that Russia has produced, and I am glad to make my acknowledgement to him along with others who have assisted us in developing the best methods for gun-shot wounds and fractures in the surgery of the present time.

H WINNETT ORR, M D, Lincoln Neb

MISS ELIZABETH KENNY'S BOOK ON "THE TREATMENT OF INFAN- TILE PARALYSIS IN THE ACUTE STAGE"

To the Editor:—THE JOURNAL published recently a review of a book by Miss Elizabeth Kenny entitled "The Treatment of Infantile Paralysis in the Acute Stage." The book is not easy to read or easy to understand and contains much controversial material. During 1941 I used the Kenny treatment as far as it was possible in the hospitals to which my patients were admitted. I am convinced that this is the best treatment for the victims of infantile paralysis during the early postparalytic period. Regardless of the confusion occasioned by the theory as outlined by Miss Kenny, the method is definitely good. Not only do I believe that this is true of the hot moist fomentations which are used twelve hours each day on patients who have had the disease but I believe that the muscle training program carried out by workers trained by Miss Kenny represents the best type of physical therapy which I have yet seen used in the after-care of patients with infantile paralysis.

I have been favorably impressed by the fact that in her work in Minneapolis not one single curvature of the spine has developed, even though many of these patients are ambulatory and are not wearing and have not worn braces to support the spine.

EDWARD L. COMPERE, M.D., Chicago.

THE GRAYING OF HAIR

To the Editor:—On numerous recent occasions the subject of gray hair and the possible effects on it of various vitamins or other chemical substances have been dealt with more or less in scientific and medical literature, including THE JOURNAL (January 24, p. 302); but so far as I am aware not one of the writers has attempted to explain to himself and others what gray hair really means and how it could possibly be affected.

It may seem elementary, but it might be useful to ask ourselves just what is hair and what are its functions?

These queries might seem to be adequately answered by the statement that hair is an appendage of the skin and serves for protection of the surface of the body. But this is not the whole story. The hair, collectively, is not a mere appendage of the skin but also a form of an "organ" serving various purposes besides mere passive protection. It aids in cutaneous sensitivity; on the head and face it has also esthetic and sex significance; and in general, through its pigment, it is a fairly important means of elimination of by-products of metabolism.

Enlarge the hair a thousand times and it will be seen to contain a great many grains of melanin, which directly or indirectly have been abstracted by it from the blood. Make a count of the hair that man cuts and loses during his life—the material thus eliminated will assume a respectable proportion.

The ordinary graying of hair signifies not that the melanin is changing in or losing color but that less and less of it is formed and hence present. The thoroughly "gray" or white hair is that which is entirely free from all melanin. Now it is quite conceivable that under starvation or prolonged severe nervous stresses the production of melanin, and hence its elimination, may be diminished or even cease and that when conditions are restored to normal the formation and elimination of the substance through the hair recommence, as had evidently taken place in the case of Major Greely. A really sudden graying, however, would seem impossible, for the melanin is dead and inert and cannot possibly be decolorized by any mental effect. If sudden graying is a reality, which has not yet been scientifically established, then the loss of color must be due to other

factors—perhaps the sometimes suggested bubbles of gas in the medulla of the hair.

If the hair and its "pigment" are viewed in this manner and the normal graying is regarded as a gradual decline in the production of melanin, it is difficult to see how any vitamin or other substance given to the subject could restore former conditions. Something of this nature could conceivably be possible for a time in the early stages of the process but would steadily grow more difficult with time until it became impossible. It would be in vain, it would appear, to expect now or in the future more from drugs or other substances than a possible delay of graying, or a partial halting of the process, with perhaps moderate restoration for a time, during the earlier stages of the graying period.

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Curator, Division of Physical Anthropology,
Smithsonian Institution.

Medical Examinations and Licensure

COMING EXAMINATIONS AND MEETINGS

UNITED STATES PUBLIC HEALTH SERVICE

Examination. Assistant Surgeon (medical only), commissioned corps. Examinations will be held as follows:
U. S. P. H. S. Hospital, Fort Worth, Texas. March 27
U. S. Marine Hospital, New Orleans March 30
Liaison Office, U. S. P. H. S., Room 319, Grant Bldg., Atlanta, Ga. March 31
Apply Surgeon General, U. S. P. H. S., Washington, D. C.

NATIONAL BOARD OF MEDICAL EXAMINERS EXAMINING BOARDS IN SPECIALTIES

Examinations of the National Board of Medical Examiners and Examining Boards in Specialties were published in THE JOURNAL, March 7, page 839.

BOARDS OF MEDICAL EXAMINERS

ALABAMA. Montgomery, June 16-18. Acting Sec., Dr. B. T. Austin, 519 Dexter Ave., Montgomery.
ARIZONA. * Phoenix, April 7-8. Sec., Dr. J. H. Patterson, 826 Security Bldg., Phoenix.
ARKANSAS. * Medical. Little Rock, June 4-5. Sec., Dr. D. L. Owens, Harrison. Eclectic. Little Rock, June 4-5. Sec., Dr. Clarence H. Young, 1415 Main St., Little Rock.
CALIFORNIA. Written. San Francisco, June 29-July 2. Oral examination (required when reciprocity application is based on a state certificate or license issued ten or more years before filing application in California), San Francisco, March 18. Sec., Dr. Charles B. Pinkham, 1020 N. St., Sacramento.
COLORADO. * Endorsement. Denver, April 7. Examination. Denver, April 8-10. Application must be on file not later than March 21. Sec., Dr. George R. Buck, 831 Republic Bldg., Denver.
CONNECTICUT. * Endorsement. Hartford, March 24. Sec. to the Board, Dr. Creighton Barker, 258 Church St., New Haven.
DELAWARE. Dover, July 14-16. Sec., Medical Council of Delaware, Dr. Joseph S. McDaniel, 229 S. State St., Dover.
FLORIDA. * Jacksonville, June 22-23. Sec., Dr. William M. Rowlett, Box 785, Tampa.
GEORGIA. Atlanta, June. Sec., State Examining Boards, Mr. R. C. Coleman, 111 State Capitol, Atlanta.
ILLINOIS. Chicago, April 7-9. Superintendent of Registration, Mr. Philip M. Harman, Department of Registration and Education, Springfield.
INDIANA. Indianapolis, June 16-18. Sec., Board of Registration and Examination, Dr. J. W. Bowers, 301 State House, Indianapolis.
KANSAS. Kansas City, June 2-3. Sec., Board of Medical Registration and Examination, Dr. J. F. Hassig, 905 N. Seventh St., Kansas City.
KENTUCKY. Louisville, May 27-29. Sec., State Board of Health, Dr. A. T. McCormack, 620 S. Third St., Louisville.
MARYLAND. Medical. Baltimore, June 9-12. Sec., Dr. John T. O'Mara, 1215 Cathedral St., Baltimore. Homeopathic. Baltimore, June 16-17. Sec., Dr. John A. Evans, 612 W. 40th St., Baltimore.
MICHIGAN. * Ann Arbor and Detroit, June 10-12. Sec., Board of Registration in Medicine, Dr. J. Earl McIntyre, 202-4 Hollister Bldg., Lansing.
MINNESOTA. * Minneapolis, April 21-23. Sec., Dr. Julian F. Da Prato, 230 Lowry Medical Arts Bldg., St. Paul.
MISSISSIPPI. Jackson, June. Assistant Sec., State Board of Health, Dr. R. N. Whitfield, Jackson.
MONTANA. Helena, April 7-8. Sec., Dr. Otto G. Klein, First National Bank Bldg., Helena.
NEVADA. Written. May 4. Reciprocity with oral examination. May 4. Applications must be on file not later than April 20. Sec., Dr. Frederick M. Anderson, 215 N. Carson St., Carson City.
NEW JERSEY. Trenton, June 16-17. Sec., Dr. Earl S. Hallinger, 2- W. State St., Trenton.

NEW MEXICO * Santa Fe, April 13-14. Sec, Dr. Le Grand Ward
135 Sena Plaza, Santa Fe.
NORTH CAROLINA: Raleigh, June 15 Sec, Dr. W. D. James, Hamlet.
NORTH DAKOTA: Grand Forks, July 7-10 Sec, Dr. G. M. Williamson,
4½ S Third St, Grand Forks
OHIO: Endorsement. April 7. Written Columbus, June. Sec., Dr.
H. M. Platter, 21 W. Broad St, Columbus
OKLAHOMA: * Oklahoma City, June 10 11. Sec, Dr. James D. Osborn,
Jr, Frederick
OREGON * Portland, April 7. Exec. Sec, Miss Lorianne M Conlee,
608 Failing Bldg, Portland
PENNSYLVANIA Philadelphia and Pittsburgh, July. Act Sec, Bureau
of Professional Licensing, Mrs Marguerite G Steiner, 358 Education
Bldg, Harrisburg
RHODE ISLAND * Providence, April 2 3 Chief, Division of Examiners,
Mr. Thomas B Casey, 366 State Office Bldg, Providence
SOUTH CAROLINA Columbia, June 22 24. Sec, Dr. A. Earle Boozer,
505 Saluda Ave, Columbia
TENNESSEE Memphis, March 25-28. Sec, Dr. H W. Qualls, 130
Madison Ave, Memphis
TEXAS Galveston, March 23 25 Sec, Dr. T. J. Crowe, 918 20 Texas
Bank Bldg, Dallas
UTAH Salt Lake City, June 29 30. Assistant Dir, Department of
Registration, Mr G V. Billings, 324 State Capitol Bldg., Salt Lake City.
VIRGINIA Richmond, June 17-20. Sec, Dr. J. W. Preston, 30½
Franklin Rd, Roanoke.
WISCONSIN * Milwaukee, June 30 July 3. Sec, Dr. H W. Shutter,
425 E Wisconsin Ave, Milwaukee.

* Basic Science Certificate required.

BOARDS OF EXAMINERS IN THE BASIC SCIENCES

ARIZONA Tucson, March 17. Sec, Mr. Franklin E Roach, Science
Hall, University of Arizona, Tucson.
DISTRICT OF COLUMBIA Washington, April 20 21 Sec, Commission on
Licensure, Dr. George C. Ruhland, 6150 E Municipal Bldg, Washington.
FLORIDA Gainesville, June 8. Sec, Professor J F. Conn, John B.
Stetson University, De Land.
IOWA: Des Moines, April 14. Dir, Division of Licensure and Regis-
tration, Mr. H W Grefe, Capitol Bldg, Des Moines
MINNESOTA Minneapolis, April 7-8 Sec, Dr J. C. McKinley, 126
Millard Hall, University of Minnesota, Minneapolis
NEBRASKA Omaha, May 5 6 Dir, Bureau of Examining Boards,
Mrs. Jeannette Crawford, 1009 State Capitol Bldg, Lincoln
OKLAHOMA: Oklahoma City, May 15 Sec, Dr. Oscar C. Newman,
Shattuck.
OREGON Corvallis, July 11. Sec., Mr. Charles D. Byrne, University
of Oregon, Eugene
SOUTH DAKOTA Vermillion, June 5 6. Sec., Dr. G. M. Evans, Yankton.
WISCONSIN: Madison, April 11. Sec, Prof. Robert N. Bauer, 152 W.
Wisconsin Ave, Milwaukee

Bureau of Legal Medicine and Legislation

MEDICOLEGAL ABSTRACTS

Medical Practice Acts: Refusal to Enjoin Licensing Board from Holding Hearing in Revocation Proceeding.

—The medical practice act of Arkansas authorizes the appropriate board of medical examiners to revoke a license to practice for, among other things, "The representation to the board of any license, certificate or diploma which was illegally or fraudulently obtained, or the practice of fraud or deception in passing the examination" Proceedings were instituted before the eclectic state medical board of Arkansas to revoke the license of Orville Lentz Beatty, who at the time was chief of the Baker Hospital at Eureka Springs, Ark., on the charge that prior to being licensed after examination by that board in 1929 he had falsely represented to the board that he had attended the Kansas City College of Medicine and Surgery, Kansas City, Mo, during the school years 1923 to 1926, inclusive; that the diploma he represented as having obtained from that school was illegally and fraudulently obtained, and that the license issued to Beatty by the board was obtained by fraud and deception. A date was set for a hearing on the charges and appropriate notice was served on Beatty. Prior to the hearing, however, Beatty filed a bill of complaint in the Pulaski chancery court to enjoin the board from proceeding further in the matter, alleging, among other things, that he had graduated from the American Medical University of Kansas City, Mo, which was recognized and approved as a medical school in good standing by the board when he was licensed by it in 1929, that the law under which the board was proceeding against him was so vague,

indefinite and uncertain as to be invalid, and that the charges preferred against him were so vague and uncertain as to prevent him from preparing a defense. The trial court issued a temporary order restraining the board from proceeding further, and later, after overruling a demurrer interposed by the board, made its restraining order permanent. The board then appealed to the Supreme Court of Arkansas.

Beatty contended that by the demurrer the board admitted the truth of the allegations in his bill of complaint and, the facts being taken as true, the board could not now claim that it had any legal authority to revoke his license. We think, said the Supreme Court, that the effect of the demurrer in this case was to admit the truth of well pleaded facts only for the purpose for which the demurrer was filed in the chancery court and does not have the effect contended for by Beatty. Nor is there any merit in another contention of Beatty's that to revoke his license would be a violation of the fourteenth amendment to the federal constitution. The practice of medicine is not a vested right but is merely a privilege, and the right to practice medicine and surgery in Arkansas is not such a right that, when and if revoked as provided by law, the fourteenth amendment of the federal constitution would be violated.

In answer to another contention of Beatty's that the charges against him in the complaint filed with the board were so vague and indefinite that they did not constitute proper notice to him to enable him properly to prepare his defense, the Court thought it sufficient to observe that it is generally held that charges preferred against one before administrative boards are generally not required to be as specifically set forth as in pleadings in courts. As was said by the Supreme Court of Oklahoma in *Freeman v. State Board*, 54 Okla. 531, 154 P. 56:

A complaint filed before a state board of health for the purpose of revoking the license of a physician is sufficient if it informs the accused not only of the nature of the wrong charged, but of the particular instances of its alleged perpetration

The Court next dismissed as untenable a contention by Beatty that the present members of the eclectic board had no right to review the proceedings of a board composed of different members at the time he was licensed and that the present board had no power to review the issuance of a license granted by former members of the board.

Beatty next contended that even if the law under which the revocation proceedings were invoked is not void for uncertainty but is valid, and even if it should be held that the charges in the complaint to revoke his license were sufficiently definite and alleged facts which the law authorized as a ground for revocation, still the board should not be permitted to proceed against him because it is estopped by laches, that is, because it had waited nine or ten years to start proceedings to revoke his license on grounds which, if they existed at all, existed at the time he was licensed. We cannot agree, said the Court, with this contention. A part of the allegations of the complaint was that Beatty's diploma was illegally and fraudulently obtained and that the license issued to him by the board was obtained by fraud and deception. Since it is claimed that Beatty was guilty of fraud not only in obtaining his diploma but also in obtaining his license to practice in Arkansas, we think the board would have the right to proceed after the fraud, if any, had been discovered. As the basis for this holding the Court referred to *Cunningham v. State*, Tex. Civ. App, 79 S. W. (2d) 180, in which the court of civil appeals of Texas said:

The question was whether it [the license] had been fraudulently obtained, and the allegation that it was procured by a series of fraudulent acts, continuing from the present time back to the original act, was sufficient. A privilege such as this, conceived in fraud and procured by fraud, cannot be raised, by continued fraudulent devices, to the dignity of a vested right, and the state may properly invoke the aid of the courts in withdrawing the privilege at any time the fraud is uncovered.

The Court also adverted to *State Board of Health v. Roy*, 22 R. I. 538, 48 A. 802, in which the court held that where one obtains a license from a state medical board by false or fraudulent representations, it is a continuing offense and that every time such a person undertakes to practice under his license he keeps up and continues the fraud initiated when he obtained by false representations his pretended authority to practice.

We have concluded, said the Court, that the jurisdiction to hear evidence and to revoke or refuse to revoke the license of Beatty was vested by law in the eclectic state medical board, and the trial court was without jurisdiction, under the pleadings in this case, to enjoin the board from hearing and determining this question. Beatty alleged in his bill of complaint that the medical board would not give him a fair and impartial hearing and would revoke his license regardless of the law or the facts in evidence. If a hearing is had by the board which results in the revocation of Beatty's license and he believes that the action of the board is arbitrary and illegal, he then has the legal right to have the board's actions reviewed by this Court.

The Supreme Court accordingly reversed the action of the trial court restraining the board from proceeding in the revocation matter and ordered the dismissal of Beatty's bill of complaint.—*Eclectic State Medical Board v. Beatty*, 156 S. W. (2d) 246 (Ark., 1941).

Privileged Communications: Disclosures Made Under Compulsion of Court Order.—The plaintiff's left eye became defective and he consulted the defendant physician in October 1938. The defendant examined the eye, took a history of the plaintiff's trouble and prescribed a course of treatment. About a month later, following an accident, the plaintiff lost the sight in his left eye. At that time, the plaintiff was insured under an accident insurance policy by the terms of which the company agreed to pay a certain amount in the event that he lost the sight of either eye through any kind of an accident. In a suit against the insurance company to collect under the policy the defendant physician testified as a witness on behalf of the company, and the judgment was against the plaintiff. Later the plaintiff sued the defendant physician for damages alleged to have resulted from the defendant having testified in the prior suit. From a judgment for the defendant, the plaintiff appealed to the Court of Appeals of Kentucky.

The plaintiff contended that by testifying in the previous suit the defendant physician divulged confidential information obtained in a professional capacity which was privileged and that he, the plaintiff, had not waived the privilege. The plaintiff further alleged that it was because of the defendant's testimony that the plaintiff lost his suit against the insurance company. To sustain his cause of action, the plaintiff relied on section 2062a-24 of the Kentucky statutes, which provides "For the purpose of this act, and all other matter, the confidential relations and communications between physician and patient are placed upon the same basis as those provided by law between attorney and client, and nothing in this shall be so construed as to require any such privileged communication to be disclosed." This section was a part of the Vital Statistics Act, which provided, according to its title, for the registration and certification of births and deaths, the granting of burial or removal permits and the reporting of morbidity statistics.

The defendant physician first contended that section 2062a-24 was not germane to the title of the Vital Statistics Act and was therefore invalid under section 51 of the Kentucky Constitution providing that "No law enacted by the general assembly shall relate to more than one subject, and that shall be expressed in the title, . . ." The Court held, however, that the section was applicable only to transactions coming within the purview of the Bureau of Vital Statistics. Continuing, the Court said that at common law neither the physician nor the patient could claim the privilege of refusing to testify with respect to confidential communications and that since in Kentucky there was no statutory privilege other than that created by section 2062a-24, the common law rule still obtained.

The defendant physician also contended that, even though section 2062a-24 should be held valid, he was still not liable because he was compelled by the court, under penalty of contempt, to give the testimony. The evidence showed that the defendant physician had apparently been a witness for the insurance company in response to a subpoena. At the trial, timely objection by the plaintiff's counsel had been made to the proffered testimony. The objection was overruled and the defendant

was required by the court to testify. Had he declined or refused to comply with the court's ruling he would have been in contempt and subject to the penalty provided in such instances. The Court of Appeals, therefore, concluded that the defendant physician acted under compulsion as directed by the court and that to hold him liable for his acts under those circumstances would be contrary to public policy. If we should hold to the contrary, explained the Court of Appeals, witnesses in all cases would find themselves facing civil liability if they should answer a question objected to, and criminal liability if they should refuse. Thus an inducement would be thrown out to the witness to swear falsely or at least to testify in a capitulatory, vague or indefinite manner, hiding the truth, hampering the court and thwarting justice.

The judgment for the defendant physician was accordingly affirmed.—*Boyd v. Wynne*, 150 S. W. (2d) 648 (Ky., 1941).

Society Proceedings

COMING MEETINGS

- Alabama, Medical Association of the State of, Montgomery, Apr. 21-23. Dr. D. L. Cannon, 519 Dexter Avenue, Montgomery, Secretary.
- American Association of Anatomists, New York, April 1-3. Dr. Eliot R. Clark, Dept. of Anatomy, University of Pennsylvania School of Medicine, Philadelphia, Secretary.
- American Association of Industrial Physicians and Surgeons, Cincinnati, Apr. 13-17. Dr. Edward C. Holmblad, 28 East Jackson Blvd., Chicago, Managing Director.
- American Association of Pathologists and Bacteriologists, St. Louis, April 2-3. Dr. Howard T. Karsner, 2085 Adelbert Rd., Cleveland, Secretary.
- American Association of the History of Medicine, Atlantic City, N. J., May 3-5. Dr. Henry E. Sigerist, 1900 East Monument St., Baltimore, Secretary.
- American College of Physicians, St. Paul, Apr. 20-24. Mr. E. R. Loveland, 4200 Pine St., Philadelphia, Executive Secretary.
- American Federation for Clinical Research, Minneapolis, Apr. 20-21. Dr. Thomas M. Durant, 3401 North Broad St., Philadelphia, Secretary.
- American Pediatric Society, Sky Top, Pa., Apr. 30-May 2. Dr. Hugh McCulloch, 325 North Euclid Ave., St. Louis, Secretary.
- American Physiological Society, Boston, March 30-April 4. Dr. Carl J. Wiggers, 2109 Adelbert Rd., Cleveland, Secretary.
- American Society for Clinical Investigation, Atlantic City, N. J., May 4. Dr. Eugene M. Landis, University of Virginia Hospital, Charlottesville, Va., Secretary.
- American Society for Experimental Pathology, Boston, April 1-3. Dr. Harry P. Smith, Medical Laboratory Bldg., Iowa City, Secretary.
- American Society for Pharmacology and Experimental Therapeutics, Boston, March 31-April 4. Dr. Raymond N. Bieter, University of Minnesota Medical School, Minneapolis, Secretary.
- American Society of Biological Chemists, Boston, Apr. 7. Dr. A. K. Balls, Bureau of Agricultural and Engineering Chemistry, Washington, D. C., Secretary.
- American Surgical Association, New Orleans, Apr. 6-8. Dr. Charles G. Mixer, 319 Longwood Ave., Boston, Secretary.
- Arkansas Medical Society, Hot Springs National Park, Apr. 27-29. Dr. W. R. Brooksher, 602 Garrison Ave., Fort Smith, Secretary.
- Association of American Physicians, Atlantic City, May 5-6. Dr. Hugh J. Morgan, Vanderbilt University Hospital, Nashville, Tenn., Secretary.
- California Medical Association, Del Monte, May 4-7. Dr. George H. Kress, 450 Sutter St., San Francisco, Secretary.
- Federation of American Societies for Experimental Biology, Boston, March 31-April 4. Dr. D. R. Hooker, 19 West Chase St., Baltimore, Secretary.
- Florida Medical Association, Palm Beach, Apr. 13-15. Dr. Shale Richardson, 111 West Adams St., Jacksonville, Secretary.
- Georgia, Medical Association of, Augusta, Apr. 28-May 1. Dr. L. D. Shanks, 478 Peachtree St. N.E., Atlanta, Secretary.
- Iowa State Medical Society, Des Moines, Apr. 15-17. Dr. Robert L. Parker, 3510 Sixth Ave., Des Moines, Secretary.
- Louisiana State Medical Society, New Orleans, Apr. 27-29. Dr. P. T. Talbot, 1430 Tulane Ave., New Orleans, Secretary.
- Maryland, Medical and Surgical Faculty of, Baltimore, Apr. 23-26. Dr. Richard T. Shackelford, 1211 Cathedral St., Baltimore, Secretary.
- Medical Library Association, New Orleans, May 7-9. Miss Anna C. Holt, 25 Shattuck St., Boston, Secretary.
- Missouri State Medical Association, Kansas City, Apr. 27-29. Mr. E. H. Bartelsmeyer, 634 North Grand Blvd., St. Louis, Executive Secretary.
- National Tuberculosis Association, Philadelphia, May 6-9. Dr. Charles J. Hatfield, 1790 Broadway, New York, Secretary.
- Nebraska State Medical Association, Omaha, May 4-7. Dr. R. B. Adams, 416 Federal Securities Bldg., Lincoln, Secretary.
- New Jersey, Medical Society of, Atlantic City, Apr. 21-23. Dr. Alfred Stahl, 55 Lincoln Park, Newark, Secretary.
- New York, Medical Society of the State of, New York, Apr. 27-30. Dr. Peter Irving, 292 Madison Ave., New York, Secretary.
- Ohio State Medical Association, Columbus, Apr. 28-30. Mr. C. S. Nelson, 79 East State St., Columbus, Executive Secretary.
- Oklahoma State Medical Association, Tulsa, Apr. 29-May 1. Mr. R. H. Graham, 210 Plaza Court Bldg., Oklahoma City, Executive Secretary.
- Tennessee State Medical Association, Memphis, Apr. 14-16. Dr. H. H. Shoulders, 706 Church St., Nashville, Secretary.

Current Medical Literature

AMERICAN

The Association library lends periodicals to members of the Association and to individual subscribers in continental United States and Canada for a period of three days. Three journals may be borrowed at a time. Periodicals are available from 1932 to date. Requests for issues of earlier date cannot be filled. Requests should be accompanied by stamps to cover postage (6 cents if one and 18 cents if three periodicals are requested). Periodicals published by the American Medical Association are not available for lending but can be supplied on purchase order. Reprints as a rule are the property of authors and can be obtained for permanent possession only from them.

Titles marked with an asterisk (*) are abstracted below.

American Heart Journal, St. Louis

22:719-870 (Dec.) 1941

- *Intermittent Claudication as Result of Arterial Spasm Induced by Walking. W. V. Leary and E. V. Allen, Rochester, Minn.—p. 719.
- Systolic Gallop Rhythm. S. Himohara, Kyoto, Japan—p. 726.
- Estimation of Cardiac Output from Blood Pressure and Pulse Wave Velocity Measurements on Subjects with Cardiovascular Disease. I. Cardiovascular Disease Other Than Aortic Regurgitation. H. C. Bazett, L. B. Laplace and J. C. Scott, Philadelphia—p. 737.
- Id. II. Aortic Regurgitation. H. C. Bazett, L. B. Laplace and J. C. Scott, Philadelphia—p. 749.
- *Record Case of Tetralogy of Fallot, with Comments on Metabolic and Pathologic Studies. J. H. Talbott, F. S. Coombs, B. Castleman, F. L. Chamberlain, W. V. Consolazio and P. D. White, Boston—p. 754.
- Distribution of Surface Potential on Chest in Intraventricular Block. A. Bohning, L. N. Katz and R. Langendorf, Chicago—p. 778.
- Changes in Form of Beating Mammalian Heart, as Demonstrated by High Speed Photography. H. B. Burchell, Rochester, Minn., and M. B. Visscher, Minneapolis—p. 794.
- Electrocardiogram in Induced Fever. P. T. Knies, Columbus, Ohio—p. 804.
- Myocardial Degeneration with Hypertrophy and Failure of Unknown Cause. J. A. Reisinger and B. Blumenthal, Washington, D. C.—p. 811.
- Syndrome Due to Occlusion of All Arteries Arising from Aortic Arch: Report of Case Feared by Primary Thrombocytosis and Auto-hemagglutination. P. M. Aggeler, S. P. Lucia and J. H. Thompson, San Francisco—p. 825.
- *Passage of Hollow Needle into Venous Blood Stream to Heart, Through Cardiac Wall and into Thorax. Report of Case. S. Shapiro, New York—p. 835.

Intermittent Claudication Induced by Walking.—Leary and Allen report 4 cases in which intermittent claudication as a result of arterial spasm was induced by exercise. The distress was the result of a diminished flow of blood to the extremities. The decrease definitely resulted from spasm of arteries, which is difficult to explain, for the usual arterial response to exercise is dilatation. Systolic bruits were heard over the abdominal aorta in 2 cases. Such bruits should suggest arterial disease. Calcification was revealed in the roentgenograms of the abdominal aorta in these 2 cases. The murmurs were similar to those produced by aneurysms. The circulatory disturbance was caused by an aneurysm, but how the disturbance was provoked remains unexplained. The other 2 patients had had thrombophlebitis and chronic venous insufficiency. It seemed probable that the residue of acute thrombophlebitis produced a "reverse sensitivity" of the arteries, so that they contracted, instead of dilating, when the patient exercised. The exact explanation remains obscure, although the clinical facts are impressive. When a patient relates a conclusive history of intermittent claudication, occlusive arterial disease is not excluded but the arterial pulsations must be studied before and after exercise. If evidence of a paradoxical reaction of the arteries is present, localized obliteration of the smaller arteries, as described by Veal, must be considered.

Tetralogy of Fallot.—Talbott and his colleagues report the clinical, metabolic and pathologic data on a youth of 19 with congenital heart disease presenting the tetralogy of Fallot. Postmortem examination confirmed the clinical diagnosis. The patient was first seen at 18, when he stated that his lips had been blue since the age of 2 years. He agreed to participate in a metabolic experiment intended to investigate the effects of prolonged anoxemia at a barometric pressure equivalent to that at sea level. He remained in the research ward for approximately a month. He was readmitted to the hospital on three occasions within one year. Subacute bacterial endocarditis was suspected, though blood cultures showed no growth. A colon bacillus abscess of the cerebrum was immediately responsible for his death. The metabolic investigations revealed a profound

variation from the normal in the acid-base equilibrium and changes in renal function. Seventy-five per cent of the blood in the heart chambers was thought to traverse a right to left shunt. The oxygen saturation of the arterial blood varied from 62 to 58 per cent, the oxygen capacity was about 35 volumes per cent and the carbon dioxide content was less than 33 volumes per cent. The arterial pH of the serum was less than 7.29. A profound, uncompensated acidosis was attributed to the increased concentration of undetermined acids and failure of the respiratory center to maintain the usual balance between free and combined carbon dioxide. The functional renal insufficiency was attributed to anoxemia, venous congestion and acidosis.

Passage of Needle into Blood Stream.—Shapiro reports an instance in which a needle used for an intravenous injection became separated from the hub and entered the blood stream. The patient did not complain of pain or other symptoms. Immediate roentgenograms of the arm and chest failed to reveal the needle. A month later a posteroanterior roentgenogram of the chest revealed a linear shadow corresponding to the dimensions of the lost needle. The needle was lying horizontally at the level of the eighth thoracic vertebra. Fluoroscopy showed that the needle lay outside the heart. It appeared to be embedded in the prepericardial fat between the inferior surface of the apex of the heart and the left dome of the diaphragm. The patient has not had any circulatory, cardiac, pulmonary or pleural complaint. Five subsequent roentgen examinations revealed no change in the position of the needle. The electrocardiograms, blood pressure, heart rate, the size of the heart and the cardiac rhythm have remained normal. Cardiac murmurs have not been heard.

American Journal of Ophthalmology, Cincinnati

24:1349-1474 (Dec.) 1941

- Experimental Studies on Vitreous Detachment. L. von Sallmann, New York—p. 1349.
- Glomas of Retina: Histopathologic Study. Edith M. Parkhill and W. L. Benedict, Rochester, Minn.—p. 1354.
- *Cerebral Symptoms Accompanied by Choked Optic Disks in Types of Blood Dyscrasia. C. H. Watkins, H. P. Wagener and R. W. Brown, Rochester, Minn.—p. 1374.
- Normalized Heterogeneous and Homogeneous Corneal Transplantation—Experimental. M. Wiener and H. D. Rosenbaum, St. Louis—p. 1384.
- *Toxic Syndrome of Ocular Tuberculosis. C. Charlin, Santiago, Chile, translated by F. A. Wies, New Haven, Conn.—p. 1392.
- Value of Gonioscopy in Prognosis and Treatment of Glaucoma. M. U. Troncoso, New York—p. 1396.
- Autofunduscopy (Autoretinoscopic); Auto Ophthalmoscopy of Eber, Purkinje Figure (of Walker). L. C. Drews, St. Louis—p. 1403.
- Orthoptic Training and Surgical Correction of Strabismus: Comparative Study of Binocular Vision in 324 Surgical Cases With and Without Orthoptic Training. C. Berens, A. J. Elliot and Lucille Sobacke, New York—p. 1418.
- Exophthalmos: First Manifestation of Thyrotoxicosis. E. L. Covitz, Boston—p. 1423.

Choked Disk in Blood Dyscrasias.—Watkins and his colleagues encountered papilledema of the type usually designated as "choked disk" in 4 patients with various types of blood dyscrasia, but there was no clinical related intracranial pathologic process or involvement, nor was such involvement observed at the necropsy of 2 of the patients. Three of the patients presented the picture of thrombocytopenic purpura and 1 that of recurrent severe hemorrhage from a gastric ulcer. It is suggested that the papilledema was produced by essentially the same mechanism in the 4 patients: a local reaction of the tissues of the optic nerves to the anoxemia resulting from the loss of blood. Cerebral edema from loss of blood may at times be a factor in the development of papilledema and of paralysis of the lateral rectus muscles in such cases.

Toxic Syndrome of Ocular Tuberculosis.—Charlin observed that not only will the patient with an ocular lesion sensitive to tuberculin treatment see better after therapy but his appetite, sleep, energy, weight and general health will improve. He has noticed that such lesions are accompanied by headaches, anorexia, gastrointestinal changes, insomnia, somnolence, asthenia and loss of weight and in certain women also by dysmenorrhea, night sweats, fever and an appearance of illness. In other words, these ocular lesions sensitive to tuberculin were accompanied by a toxic syndrome. This toxic syndrome, with parallel development, changed with the ocular disease. If under tuberculin therapy the ocular disorder improved the general

condition or toxic syndrome improved. A relation between the two pathologic phenomena seemed inescapable, and clinically the author accepted a priori that the two were the result of a common cause.

Archives of Physical Therapy, Chicago

22:707-770 (Dec.) 1941

- Internal Radiant Heat in Lesions of Pelvis. B. N. Bengtson, Maywood, Ill.—p. 711
Active Exercise in Fracture Treatment. R. H. Kennedy, New York.—p. 720.
Physical Measures in Rehabilitation. C. R. Brooke, Newark, N. J.—p. 724.
Evaluation of Short Wave Diathermy. R. Kovács, New York.—p. 732.

Bulletin New York Academy of Medicine, New York

18:1-80 (Jan.) 1942

- Basic Hemodynamic Principles Essential to Interpretation of Cardiovascular Disorders. C. J. Wiggers, Cleveland.—p. 3
Heart Failure. P. D. White, Boston.—p. 18
Arteriosclerosis: Social Significance and Recent Advances in Treatment. G. M. Piersol, Philadelphia.—p. 36
Recent Studies in Production of Cancer by Chemical Compounds: Conditioned Deficiency as Mechanism. C. P. Rhoads, New York.—p. 53
History of Fever Therapy in Treatment of Disease. W. Bierman, New York.—p. 65.

Canadian Medical Association Journal, Montreal

45:479-584 (Dec.) 1941

- *Mechanism of Cross Infection of Wounds in Hospital by Hemolytic Streptococci. Reba E. Willits and R. Hare, Toronto.—p. 479.
Jaundice as the Pediatrician Sees It. R. McIntosh, New York.—p. 488.
Treatment of Hydronephrosis Secondary to Aberrant Renal Vessels. F. S. Patch and J. T. Codnere, Montreal.—p. 495.
Surgical Treatment of Strabismus. A. L. Morgan, Toronto.—p. 500.
Radiologic Consideration of Coarctation of Aorta (Adult Type). C. L. Ash, Toronto.—p. 505.
Chemotherapy of Meningococcal Meningitis. H. Little, London, Ont.—p. 509.
Relation of Arteriosclerosis and Arterial Hypertension to Mental Disorder. K. Stern, Verdun, Que.—p. 513.
Problems of Army Hygiene. M. R. Elliott, Wolfville, N. S.—p. 517.
Management of Carcinoma of Cervix Uteri. B. R. Mooney, Winnipeg, Man.—p. 521.
Review of Thoracoplasties in Saskatchewan. W. S. Barclay, Saskatoon, Sask.—p. 525.
*Obliterative Vascular Disease: Treatment by Sympathectomy. R. I. Harris, Toronto.—p. 529.
Fetal Shock: Treatment with Desoxycorticosterone Acetate (Preliminary Report). M. Berling, Brooklyn.—p. 534.
Local Anesthesia in Obstetrics. N. W. Philpott, Montreal.—p. 539.
Use of Vitamin P in Edema of Pregnancy Toxemia. E. Shute, London, Ont.—p. 542.
Natural History of Migraine. J. W. Scott, Edmonton, Alta.—p. 543.

Mechanism of Cross Infection of Wounds.—Willits and Hare state that the skin, bedding and surroundings of patients with infected wounds harbor hemolytic streptococci. Therefore the chances of conveying infection by the hands or by instruments handled by the personnel are by far greater than is usually supposed. The air around patients, even those with small wounds, may be polluted, and thus air borne infection is possible. That the margin of safety of the ward infection of wounds is extremely narrow is demonstrated by the increase in the amount of sepsis that occurs in war time when wards are crowded and poorly ventilated and when the personnel is overworked. The margin of safety is narrow because the entire contents of the bed of a patient with an infected wound and the patient himself may be potentially infective for other patients. The infectivity does not cease at the periphery of the bed; it extends as a miasma in the air around and about it. Thus infection may be transmitted not only by air currents but also by the hands of the personnel who touch the bedclothes, bathe the patient and dress his wound and without washing their hands attend an uninfected wound. Even the outer layers of the dressings may be contaminated. The obvious inference is that a patient with an infected wound should not remain in the same ward with patients with clean, uninfected wounds. Transfer of infection from patient to patient seldom occurs during peace time, but with the almost inevitable hurry and overcrowding in war time the barriers break down. The suggestions for minimizing cross infections are provision of a wing for all patients with any sign of infection, the division of the nursing and surgical staffs so that no one attending a patient with an infected wound will come in contact with a patient with a clean wound, and the segregation and bacteriologic control of all patients and personnel with nasopharyngeal infection. Alternative measures (the treatment of bedding with liquid petro-

latum, the oiling of floors and the ultraviolet irradiation of wards) seem to be too elaborate for general adoption, particularly during war time. Furthermore, under the stress of warfare these measures might break down.

Sympathectomy for Vascular Disease.—Harris believes that conservative measures are to be employed in all early cases. Lumbar sympathectomy should be considered when severe intermittent claudication is constant, when pain is present during rest and when trophic changes or impending gangrene appears. Success is possible when the existing degree of vasospasm superimposed on the obliterative vascular disease can be abolished by the operation. Even when the Landis test and spinal anesthesia show little or no vasospasm, some benefit often follows sympathectomy. If these tests show that the cutaneous temperature of the foot rises 5.4 degrees F., a good result from lumbar sympathectomy can be predicted. When the rise of temperature is less than this sympathectomy is probably still justified, for even if only pain during rest is relieved the result is worth while, as amputation is avoided or postponed. Sympathectomy should be performed before gangrene and open trophic lesions have developed. Sympathectomy should be considered for every patient with severe Buerger's disease. The situation is different in peripheral arteriosclerosis, as patients with this disease are old and usually past the wage earning period. Moreover, with their vascular disease serious vascular lesions in various organs—the brain, the heart and the kidney—may exist. Only patients with peripheral arteriosclerosis who have no organic disease or serious vascular disease elsewhere and whose life cannot be slowed down to a tempo within the boundaries of their circulatory sufficiency are suitable for the procedure. During the last ten years at the Toronto General Hospital sympathectomy has been performed for 39 patients with vascular disease. Of 2 patients with Raynaud's disease the result was good in 1 and poor in the other; a young woman with an obscure vascular lesion experienced a good result; the result was good in 5, fair in 1 and poor in 7 of the 13 patients with arteriosclerosis, and of the 23 with Buerger's disease the result was good in 13, fair in 7 and poor in 3. A good result was sustained relief from pain and intermittent claudication and ability to work. A fair result was slight or moderate improvement in circulation, unsustained but pronounced relief from pain or relapse with gangrene after a period of relief. Little or no improvement following sympathectomy was considered a poor result.

Cancer Research, Baltimore

1:919-1018 (Dec.) 1941

- Experimental Brain Tumors: I. Tumors Produced with Methylcholanthrene. H. M. Zimmerman and Hildegard Arnold, New Haven, Conn.—p. 919.
Comparison of Methyl Salicylate and Benzene as Solvents for Methyl cholanthrene. W. J. Burdette and L. C. Strong, New Haven, Conn.—p. 939.
Comparison of Methylcholanthrene Hyperplastic Epidermis with Benign Hyperplastic Epidermis in Healing Wounds. T. X. Paletta, E. V. Cowdry and C. E. Lischer, St. Louis.—p. 942.
Chemical Configuration and Carcinogenesis. C. E. Dunlap and S. Warren, Boston.—p. 953.
Occurrence in Whole Blood of Material Influencing Incidence of Mammary Carcinoma in Mice. G. W. Woolley, L. W. Law and C. C. Little, Bar Harbor, Maine.—p. 955.
Experimental Studies on Genetics of Spontaneous Leukemia in Mice. R. K. Cole, Ithaca, N. Y., and J. Furth, New York.—p. 957.
Effect of Colchicine on Mitotic Activity of Brown Pearse Rabbit Epithelioma. B. DuBilier and S. L. Warren, Rochester, N. Y.—p. 966.
Steroid Excretion in Cancerous and Noncancerous Persons: II. Urinary Estrogens. G. Pincus and W. H. Pearlman, Worcester, Mass.—p. 970.

Illinois Medical Journal, Chicago

80:437-518 (Dec.) 1941

- Recurring or Persistent Giant Urticaria (Angioneurotic Edema). R. F. Farguharson, Toronto, Canada.—p. 454.
Hemolytic Staphylococcus Septicemia. A. G. Wolfe, Jacksonville.—p. 457.
Sterility. W. C. Scriver, East St. Louis.—p. 462.
Causes and Prevention of Blood Transfusion Reactions. L. M. Zerman, Anne Marie Strauss and H. Laufman, Chicago.—p. 466.
Climacteric and Menopause. E. N. Nash, Galesburg.—p. 472.
Physiologic Changes Incident to Puberty. F. T. Jung, Chicago.—p. 477.
Graphic Changes of Coronary Occlusion. J. B. Carter, Chicago.—p. 485.
Problems in Nutrition in Allergy: Report of Case of Optic Neuritis on Allergic Basis. Helen C. Hyden and Bethah Cushman, Chicago.—p. 500.
Cervical Polyp. W. B. Serbin, Chicago.—p. 503.
Meningitis with Diabetic Coma. W. D. McNally, Chicago.—p. 517.

Journal of Clin. Endocrinology, Springfield, Ill.

1:931-1020 (Dec.) 1941

- Basal Heat Production in Hypogonadism in Men and Its Increase by Prolonged Treatment with Testosterone Propionate. Irene Sandiford, Kathryn Knowlton and A. T. Kenyon, Chicago.—p. 931.
- Rapid Growth in Height Produced by Chorionic Gonadotropin in Dwarfed Infantile Identical Twin. G. B. Dorff, New York.—p. 940.
- Effect of Pregnancy Urine Hormone and Vitamin B₁₂ on Blood and Bone Marrow Pictures in Primary Erythroblastic Anemia (Cooley). L. M. Goldman and A. Malavazos, Newark, N. J.—p. 945.
- Occurrence of Unusual Amounts of Estrogens in Urine of Boys with Progressive Muscular Dystrophy. A. S. Minot, Nashville, Tenn.—p. 949.
- Daily Variation in 17-Ketosteroid Excretion of Men and Women. S. C. Werner, New York.—p. 951.
- Relation of Arteriosclerosis to Diabetic Neuritis of Lower Extremities. A. J. Kauvar, Boston.—p. 953.
- Effects of Large Doses of Intravenous Insulin in Psychotic Non-diabetic Patients. S. M. Horvath and E. Friedman, Boston.—p. 960.
- Relative Effectiveness of Several Methods of Administering Desoxycorticosterone Acetate. G. W. Thorn, R. L. Greif, S. O. Coutinho and H. Eisenberg, Baltimore.—p. 967.
- Abnormal Suprarenal Discharges in Angina Pectoris and Their Control by X-Ray Therapy. W. Raab, Burlington, Vt.—p. 977.
- Therapeutic Use of Estrone Suspensions. S. C. Freed and J. P. Greenhill, Chicago.—p. 983.
- Oral Administration of Methyl Testosterone in Gynecology. M. Berling, Brooklyn.—p. 986.
- Patterns of Uterine Motility in Normal Ovulatory and Anovulatory Cycle, After Castration, Coitus and Missed Abortion. W. Bickers and R. J. Main, Richmond, Va.—p. 992.

Journal of Lab. and Clinical Medicine, St. Louis

27:279-418 (Dec.) 1941

- Social Revolution and the Physician. W. T. Vaughan, Richmond, Va.—p. 279.
- Pharmacology of Thymoxyethyldiethylamine. D. R. Climenko, E. Homburger and F. H. Messer, Rensselaer, N. Y.—p. 289.
- *Menopause Arthralgia, with Preliminary Report on Use of Stilbestrol. W. K. Ishmael, Oklahoma City.—p. 297.
- Cardiac Depression by Mercurial Diuretics. R. L. Johnston, Cincinnati.—p. 303.
- Effect of Supplemental Amylase on Digestion. J. M. Beazell, Chicago.—p. 308.
- Experimental Asthma: Treatment with Histaminase. F. L. Neely, New York.—p. 319.
- Enteral Absorption of Pollen Antigen. G. E. Rockwell, Cincinnati.—p. 328.
- Age Incidence of Positive Tuberculin Reactions (Mantoux). Frances Pascher and M. B. Sulzberger, with statistical analysis by A. S. Wiener, New York.—p. 332.
- Question of Protection Against Histamine and Anaphylactic Shock in Guinea Pigs by Histaminase. R. C. Hawes, G. A. Alles and H. Miller, Los Angeles.—p. 337.
- Lipomelanotic Reticular Hyperplasia of Lymph Nodes: Report of Case. L. A. Soloff, Philadelphia.—p. 343.

Menopausal Arthralgia.—Ishmael treated women with menopausal arthralgia according to the following plan: 1. A low carbohydrate, high vitamin diet was given to patients who were overweight and a normal, well balanced diet to the others. Traumatic factors (cold, dampness and drafts) were avoided. Foci of infection were left alone during active treatment or while rheumatic symptoms were present. Supplementary vitamins were given patients with clinical deficiency. Metabolism, gastrointestinal function, emotional stress and posture were corrected, and pain was relieved. 2. Specific treatment included administration of estrogenic substances, autohemotherapy and artificial induction of fever. 3. Physical therapy consisted of the local and general application of heat. Except in case of acute arthralgia the application of heat was usually followed by a brief application of cold. 4. Acutely affected areas were supported or immobilized in splints. Of 60 patients given 10,000 units of diethylstilbestrol by injection, 80 per cent had a complete remission, 15 per cent were improved and 5 per cent failed to respond. Of 30 patients given diethylstilbestrol orally 77 per cent had a complete remission, 10 per cent were improved and 13 per cent failed to respond. Thirty patients who had been receiving estrogenic substances were without their knowledge given diethylstilbestrol instead, and of these 82 per cent noticed no change, 15 per cent stated they were better and 3 per cent said the pain was increased. Of 60 patients receiving estrogenic substances by injection 82 per cent have had a complete remission, 10 per cent were improved and 8 per cent failed to improve. Of 34 patients receiving estrogenic substances orally 30 per cent had a remission, 35 per cent were improved and 35 per cent failed to improve. Patients who had a remission of their arthralgia also experienced relief from other menopausal symptoms. It is best to give diethylstilbestrol orally in 0.5 instead of 1 mg. doses.

Journal-Lancet, Minneapolis

61:471-506 (Dec.) 1941

- *Evaluation of Vitamin E in Treatment of Multiple Sclerosis and Progressive Muscular Atrophies. R. L. Meller, Minneapolis.—p. 471.
- X-Ray Technic. R. G. Allison, Minneapolis.—p. 478.
- Oliguria and Hematuria Following Administration of Sulfathiazole and Relieved by Renal Pelvic Lavage: Case Report. N. O. Brink and J. F. Shandorf, Minneapolis.—p. 480.
- Diagnosis of Rheumatic Fever. M. J. Shapiro, Minneapolis.—p. 481.
- Effect of Gelatin Feeding on Strength and Weight According to Body Build. Helen B. Pryor and Maud L. Knapp, Palo Alto, Calif.—p. 484.
- Functional Lighting in College. J. O. Kraehenbuehl, Urbana, Ill.—p. 486.

Vitamin E for Multiple Sclerosis.—Meller studied the effect of vitamin E therapy in 9 patients with amyotrophic lateral sclerosis, 5 with primary muscular atrophy and 12 with multiple sclerosis. The 12 patients with multiple sclerosis experienced no benefit from intensive vitamin E therapy. Of the other 14, 3 apparently recovered, 7 showed definite improvement and 4 obtained no benefit. Large doses given over a long time were required for improvement to ensue. The following daily doses are suggested: 100 mg. of alpha-tocopherol given intramuscularly for six to eight weeks or 150 to 200 mg. of the drug given orally for a similar time. No toxic symptoms attributable to the medication were observed. The evidence suggests that in at least some cases amyotrophic lateral sclerosis and primary muscular atrophy are metabolic or nutritional diseases. One of the apparently recovered patients had hereditary muscular atrophy and thus supports the proposition that hereditary factors do not necessarily preclude recovery or improvement. It is suggested that the terms amyotrophic lateral sclerosis and primary muscular atrophy be replaced by the more descriptive term motor neuronopathy.

Journal of Pediatrics, St. Louis

19:731-880 (Dec.) 1941

- The Academy and National Defense. P. M. Stimson, New York.—p. 731.
- Need for Efficient Child Health Service in World at War: Lessons from France. H. C. Stuart, Boston.—p. 736.
- Children in Defense Program. Martha M. Eliot, Washington, D. C.—p. 740.
- Nutrition and War. T. Parran, Washington, D. C.—p. 748.
- Pediatrics and Clinical Protection of Child Development. A. Gesell, New Haven, Conn.—p. 755.
- *Pyknolepsy: Study of Diagnosis and Prognosis. J. W. Owen and L. Berlinrood, New York.—p. 762.
- *Advances in Treatment of Meningitis. A. L. Hoyne, Chicago.—p. 778.
- Study of Insulin Tolerance and Glucose Tolerance Tests on Normal Infants. W. A. Daniel Jr., with technical assistance of Josephine Cunningham, Chicago.—p. 789.
- Observations on Malformation of Head in Mongoloid Deficiency. C. E. Benda, Wrentham, Mass.—p. 800.
- Nonhemolytic Familial Jaundice: Report of Family. H. A. Carithers Jr., New York.—p. 817.
- Influenza Meningitis in Seven Month Old Infant. M. Josephi, Julia Mehlman and Dorothy Hager, New York.—p. 823.
- Multiple Cystic Tuberculosis of Long Bones. L. K. Sweet and D. J. Abramson, Washington, D. C.—p. 826.
- Preventive Aspect of Behavior Problems in Children. H. K. Tenney Jr., Madison, Wis.—p. 833.

Pyknolepsy.—Owen and Berlinrood discuss the diagnostic and prognostic data on the pyknolepsy in the 42 instances of spontaneous cessation of attacks encountered among the 299 cases reported in the literature. The distribution between the sexes was even. The onset was usually between the ages of 2 to 13 years. The attacks ceased between the ages of 5 and 18, with a peak (24 per cent) at 11 years. The duration of the illness was from a few months to ten years, in the largest number of cases lasting two years. The course was generally monotonous; there were occasional attack free periods (varying from an occasional day to three months). The free periods did not recur more than three times in any case. The frequency of attacks varied from one to one hundred and fifty a day, usually from ten to fifty. The duration of the attacks was one second to two minutes, usually ten to twenty seconds. A single attack rarely lasted more than one minute. Generally, consciousness was only partially affected though amnesia was usually complete. Other frequent features of attacks were blinking, upward rolling of the eyes, gross bodily motions and amnesia. The attacks were usually little affected by outside circumstances. They were decreased briefly by phenobarbital,

bromides, suggestion and activity, and occasionally they were increased by fatigue, constipation, climatic changes, phenobarbital, bromides, fear, excitement and anger. The intelligence of the patients was usually high and remained so. A family history of epilepsy was present in 19 per cent. The past history and physical status showed 6 patients to have had an abnormal birth; 4 had a minor neurologic residue and 12 had minor physical defects. Five had had grand mal seizures either in infancy or just before pyknolepsy began, without any evidence of grand mal epilepsy during the course of the pyknolepsy. Only 1 patient had grand mal epilepsy after pyknolepsy began and this for three months just after the pyknolepsy terminated. Patients with the following characteristics have a good chance of spontaneous recovery: onset between the ages of 2 and 13, a fairly monotonous daily frequency, attacks lasting not more than thirty seconds, only partial clouding of the consciousness, attacks that are readily precipitated by hyperpnea, with no reaction to drugs or to emotional situations and without the accompaniment of features of grand mal seizures, such as falling with injury, tongue biting, important vasomotor changes, pulse changes, aura or postattack sensations.

Advances in Treatment of Meningitis.—Hoyne lists among the advances in the treatment of meningitis the discontinuance of intrathecal therapy, the abandonment of frequent lumbar punctures and the introduction of chemotherapy. Among 34 patients with the disease who recovered only 3 received intraspinal therapy. The paucity of lumbar punctures was conspicuous. The author's 3 patients who recovered were treated with sulfapyridine. The goal in the treatment of meningitis in most instances is chemotherapy. For purpuric or other unusually severe forms of the disease it is probably advisable to give large doses of meningococcus antitoxin or standard antimeningococcus serum intravenously in addition to chemotherapy. Sulfanilamide and sulfapyridine are equally effective. Sulfathiazole is also frequently satisfactory. Sulfapyridine is acceptable for any form of meningitis in which there is a chance of a favorable response except for staphylococcal infection. There is still one unyielding form of bacterial meningitis, the tuberculous.

Journal of Thoracic Surgery, St. Louis

11:131-240 (Dec.) 1941

- Major Changes in Fundamental Relationships of Respiratory Drive Mechanisms During Evyral and Pentothal Anesthesias, with Special Consideration of Possible Applications to Transpleural Surgery. C. A. Moyer, Boston—p. 131.
Observations on Effects of Prolonged Administration of High Oxygen Concentration to Dogs. J. R. Paine, D. Lynn and A. Keys, Minneapolis—p. 151.
Chronic Nontuberculous Empyema. A. O. Singleton and R. M. Moore, Galveston, Texas—p. 169.
Use of Sulfanilamide in Partial and Total Resection of Lung. I. I. Allbritten Jr., J. B. Flick and J. H. Gibbon Jr., Philadelphia—p. 187.
Experimental Observations on Use of Drugs of Sulfonamide Group in Pleural Space. E. M. Kent and E. A. Graham, St. Louis—p. 196.
Local Use of Sulfanilamide in Pleural Cavity. T. H. Burford and E. A. Graham, St. Louis—p. 203.
Giant Cell Tumor of Trachea. J. M. Cid and J. L. Bonilla Jr., Rosario, Argentina—p. 210.
Metastatic Carcinoma of Lung Invading and Obstructing Bronchus. F. Raine, Milwaukee—p. 216.
Diaphragmatic Hernia with Penetrating Ulcer of Herniated Stomach. Case Corrected by Surgery. L. W. Frank and J. E. Hamilton, Louisville, Ky.—p. 219.
Bilateral Surgical Collapse for Pulmonary Tuberculosis. H. Meltzer, Nimitz, Man., Canada—p. 227.

Local Use of Sulfanilamide.—Burford and Graham introduced crystals of sulfanilamide into the pleural cavities of 23 patients after intrathoracic operations. The operations were lobectomy for lobar suppuration in 16 patients, total pneumonectomy in 4, excision of a mediastinal dermoid in 1, excision of a dermoid with amputation of the upper lobe in 1 and lingulectomy for bronchiectasis in 1. Pneumonectomy was performed for universal bronchiectasis, for bronchiogenic carcinoma without appreciable pulmonary suppuration or for a bronchiogenic tumor with extensive pulmonary suppuration. Lobectomy was done, with one exception, for bronchiectasis and/or chronic pulmonary abscess. The amount of the drug introduced, 2 to 15 Gm., depended on the size of the patient, the degree of suppuration and the extent of the contamination. Empyema did not develop in the 8 patients who at no time had an open bronchus. Putrid pleural infection developed in 15 patients who had open transient or open persistent bronchi. The previous

implantation of the drug did not prevent empyema from developing, once an open bronchus had supervened. Local use of the drug is indicated when contamination of the pleura has been extensive even though the bronchus will probably stay closed. In such cases local implantation of the drug provides a bacteriostatic medium at the point of least resistance. In all instances in which the concentration of sulfanilamide in the pleural fluid was determined, the values during the first twenty-four hours were above 200 mg. per hundred cubic centimeters. The blood concentrations demonstrate that the pleura has an efficient absorbing mechanism. A peak, as high as 10 mg. per hundred cubic centimeters of blood, was reached during the first twenty-four hours. Thereafter the curve dropped rapidly until at the end of seventy-two to ninety-six hours there was no drug in the blood stream. The authors tested each candidate with a trial dose of the drug before operation. They have seen no ill effect from the local implantation of the crystals into the pleural cavity.

Bilateral Surgical Collapse.—Meltzer discusses the status of 34 consecutive patients with pulmonary tuberculosis submitted to bilateral surgical collapse over a period of five years. In 23 the disease was far advanced and in 11 moderately advanced. Results indicate that in 55.8 per cent of the patients the tuberculosis was apparently cured, arrested or apparently arrested. 17.6 per cent of the group are working. Twenty-seven, or 79.4 per cent, had negative sputum at the time of the study. The mortality rate for the group was 28 per cent, which is considered most gratifying, as many of the patients were doubtful operative risks. Closure on the initial and on the opposite side was complete in 94.1 per cent. Twenty-two sides were collapsed by thoracoplasty in 21 patients and the cavity of 20, or 90.9 per cent, closed completely. Of twenty-five extrapleural pneumonolyses with petrolatum filling done in 22 patients twenty-three, or 92 per cent, were successful in closing all cavitation. The two unsuccessful ones were removed and replaced by thoracoplasty and both cavities closed. Of 20 patients submitted to pneumothorax, the cavities of 19 were closed successfully and in 1 a small residual cavity was evident.

Maine Medical Association Journal, Portland

32:275-294 (Dec.) 1941

- Gallbladder Disease. Some Surgical Aspects. J. M. Parker, Portland—p. 275.
Id. Liver Function Tests. I. E. Porter, Portland—p. 278.
Id. Oral Cholecystography. L. T. Thaxter and J. Spencer, Portland—p. 280.
Id. History and Symptoms. R. S. Hawkes, Portland—p. 282.

Medicine, Baltimore

20:397-520 (Dec.) 1941

- Etiology and Causative Mechanism of Arteriosclerosis and Atherosclerosis. W. C. Hueper, New York—p. 397.
Studies on Poliomyelitis. M. Theiler, New York—p. 443.
Infectious Poliomyelitis: Infectious Neuritis, Acute Poliomyelitis with Facial Diplegia, Guillain Barre Syndrome, Landry's Paralysis, etc. L. Roseman and C. D. Aring, Cincinnati—p. 463.
Clinical Epidemiology of Poliomyelitis. J. R. Paul, New Haven Conn.—p. 495.

Michigan State Medical Society Journal, Muskegon

40:937-1022 (Dec.) 1941

- Marriage After Forty. H. S. Collis, Grand Rapids—p. 965.
Sulfathiazole in Exfoliative Dermatitis. H. K. Baker, Flint—p. 973.
Movement for Registration of Vital Statistics. L. L. Klewisch, Chicago—p. 971.
Presacral Resection for Relief of Pain. J. C. Scully, Muskegon—p. 979.
Relationship of Roentgenologist to Physician and Surgeon. J. M. Bogart, Flint—p. 981.
Physiology of Nose. D. R. Heetderks, Grand Rapids—p. 993.
Successful Use of Sulfanilamide in Treatment of Blackwater Fever. B. Holm, Cadillac—p. 988.

Sulfanilamide for Blackwater Fever.—Holm encountered a case of blackwater fever in northern Michigan and successfully treated the patient with sulfanilamide. No reports of the previous use of sulfanilamide for blackwater fever are to be found. The interesting features of the case were an unusually high fever (the axillary temperature being 103.4 F.), extreme anemia, the dramatic response to sulfanilamide of a patient who was moribund and who had previously failed to respond to any form of treatment and the removal of blood pigment stones from the gallbladder. The stones probably resulted from a concentration of blood pigments because of the hemolytic anemia rather than from an infection of the gallbladder.

Military Surgeon, Washington, D. C.

89:849-958 (Dec.) 1941

- Disease and Destiny. R. A. Kilduffe.—p. 851.
Modern Technic of Spinal Anesthesia. R. B. Phillips.—p. 866.
Nutrition of the Soldier. M. H. Epstein.—p. 872.
General Anesthesia in Treatment of Maxillofacial Cases. T. E. Fischer.—p. 877.
Surgical Treatment of Essential Hypertension. W. P. E. Berwald.—p. 892.
Prophylaxis and Treatment of Epidermophytosis of Feet. P. R. Beckjord.—p. 895.
Liquefaction of Solid Foodstuffs for Diets. A. A. Neuwirth.—p. 898.
Justman Method of Eliciting the Knee Jerk: Little Known Procedure Which Merits More General Use. F. E. Weatherby.—p. 902.
Diagnostic Points Adapted from Colonel Bushnell's Teachings in Diagnosis of Pulmonary Tuberculosis by Physical Signs. J. W. Turner.—p. 903.
Surgeon Hunter Holmes McGuire: He Too Rode with Stonewall. J. M. Phalen.—p. 908.

New York State Journal of Medicine, New York

41:2371-2464 (Dec. 15) 1941

- Diet of Young Infants. C. H. Smith, New York.—p. 2395.
Medical and Social Challenge of Alcoholism. E. N. Boudreau, Syracuse, N. Y.—p. 2407.
Bleeding as Late Sequela of Gastroenterostomy and Subtotal Gastrectomy of Billroth II Type for Duodenal Ulcer. S. Mage and R. Colp, New York.—p. 2415.
Vasomotor Rhinitis: Clinical Study of Forty-Five Cases. H. I. Shashon, Albuquerque, N. M.—p. 2419.
Increase in Height and Weight Among the Underprivileged. S. C. Karlan, Dannemora, N. Y.—p. 2425.

Texas State Journal of Medicine, Fort Worth

37:513-574 (Dec.) 1941

- *Analysis of 500 Cases of Organic Heart Disease: Etiologic Types and Their Incidence. G. W. Parson, Texarkana.—p. 518.
City-County Hospital Management of Juvenile Diabetes. J. E. Dunlap, Dallas.—p. 522.
Panel Discussion on Laboratory Methods and Clinical Interpretations. S. W. Bohls, Austin; J. H. Black, J. M. Hill, Dallas; W. N. Powell, Temple, and L. M. Smith, El Paso.—p. 525.
Pulmonary Lobectomy and Pneumonectomy. R. Shaw, Dallas.—p. 529.
Electroencephalogram and Its Abnormalities in Certain Clinical Disorders. S. R. Snodgrass, Galveston.—p. 532.
Radiation Therapy in Gynecologic Conditions. J. H. Vaughan, Amarillo.—p. 536.
Delay in Labor Caused by Mild Degrees of Bandl's Ring. H. W. Johnson, Houston.—p. 538.
Acute Laryngotracheobronchitis. M. A. Davison, Marlin.—p. 541.
Stenosis of Nasolacrimal Duct. J. D. Walker, Houston.—p. 544.
Recent Advances in Public Health. W. S. Leathers, Nashville, Tenn.—p. 549.
*Critical Study of Laboratory Methods of Diagnosis of Gonorrhea in Women. C. E. Lankford, Galveston.—p. 553.

Organic Heart Disease.—Parson discusses the cause of 500 cases of organic heart disease, practically all of which he personally observed. The 500 patients were white adults, 267 men and 233 women; only 1, a girl of 18 with congenital heart disease, was less than 20. Approximately 100 were farmers or wives of farmers, 8 were physicians and the remainder were small business men, laborers and housewives. Hypertension and arteriosclerosis were the cause of the disease in 79.6 per cent. Arteriosclerotic heart disease in the absence of hypertension was uncommon in women. When arteriosclerotic heart disease without hypertension is present in women diabetes mellitus should be looked for. Rheumatic fever was responsible for the heart disease in 15.4 per cent of the patients. Only 2 patients had definite syphilitic heart disease, and in 8 the etiologic role of syphilis was questionable. Hyperthyroidism was considered the most important causative agent in 2 and a contributing factor in 3. Myxedema was the cause of cardiac signs and symptoms in 3, congenital heart disease in 6, subacute bacterial endocarditis in 4 and in the remaining 6 the disease was caused by a number of unrelated conditions. A family history of hypertensive cardiovascular disease was obtained from 69 per cent of those questioned. Tobacco was of no apparent etiologic importance. Neither was it of significance in angina pectoris and coronary occlusion. Occupation did not seem to be etiologically relevant. However, 155 of the women with hypertension were housewives. The average age of the hypertensive-arteriosclerotic group at the time the diagnosis was made was 61 years. The average age of the rheumatic group was 49 years. The patients were therefore fifteen to twenty years older than is usual for patients with rheumatic heart disease. This might have been due to the milder course of rheumatic infections in the climate

of Texas. Though rheumatic fever and allied infections are relatively uncommon causes of heart disease in this area they are sufficiently frequent to demand careful study. If they could be eliminated, approximately 15 of every 100 patients with heart disease would have some other disease.

Diagnosis of Gonorrhea.—Lankford examined 3,060 specimens from 1,107 women for the gonococcus by smear and culture methods. The number of examinations per patient ranged from one to thirty. The testing yielded 251, or 22.7 per cent, with gonococcal infection, exclusive of recurrences. Fifty patients had one to five recurrences demonstrated by culture. Nearly three times as many positive reactions were obtained by culture as were obtained by smear. In cases of untreated gonorrhea the culture was two and six-tenths times as effective as the smear; in cases of treated gonorrhea the ratio was 4.25:1. When cultures are prepared as a routine, smears may be eliminated without a significant sacrifice of accuracy. It is best to plate endocervical specimens directly rather than to use broth as an intermediate vehicle. Differential tests for the gonococcus, in addition to the Gram staining of typical, oxidase-positive colonies, are unnecessary for routine cultural diagnosis of gonorrhea in women. The results of smears bear a direct relation to the number of viable organisms in the specimen.

Virginia Medical Monthly, Richmond

68:681-736 (Dec.) 1941

- Emotional Maladjustments from Unplanned Parenthood. H. D. Coghill, Richmond.—p. 682.
Some Remarks on Principles of Medical Ethics. T. K. McKee, Saltville.—p. 688.
Management of Cystocele and Prolapsus Uteri. W. P. Barnes, Richmond.—p. 690.
Cancer in Male: Discovered in Clinic Treating Genitoinfectious Diseases. W. M. Brunet, Chicago.—p. 693.
Report of 155 Hernia Operations with Follow-Up and Method of Operative Procedure. J. T. Rountree, Harrisonburg.—p. 696.
Selected Case Reports of Maternal Deaths. Maternal Health Committee of Medical Society of Virginia.—p. 698.

Western J. Surg., Obst. & Gynecology, Portland, Ore.

49:643-688 (Dec.) 1941

- *Vocal Cord Paralysis: Its Significance in Thyroid Disease Before Operation. A. C. Davis, Rochester, Minn.—p. 643.
Analgesia and Amnesia in Obstetrics. L. C. Conn and J. R. Vant, Edmonton, Alta., Canada.—p. 650.
Subcutaneous Injuries of Abdomen. H. P. Totten and J. N. O'Neill, Los Angeles.—p. 654.
Replacement Method in Surgery of Pituitary Tumors: New Technic. E. Seletz, Los Angeles.—p. 660.
Recent Advances in Urology of Interest to General Practitioner. M. B. Wesson, San Francisco.—p. 662.

Preoperative Vocal Cord Paralysis.—Davis states that among 6,754 cases of adenomatous goiter 26 (0.38 per cent) instances of unilateral paralysis of the vocal cord were observed before and after thyroidectomy. In 12 additional cases there was a questionable diagnosis of paralysis. In 6 others a vocal cord was described as paralyzed before operation but moving normally subsequent to operation. In 11 of the 26 cases the surgeon specifically described adenomatous projections which arose on the side of the paralyzed vocal cord and extended retrotracheally. In 7 of 8 patients whose goiter was found to be substernal the vocal cord was paralyzed on the side on which the goiter extended beneath the sternum. In the remaining patient the vocal cord was paralyzed on the opposite side. In 4 of 6,453 cases of exophthalmic goiter paralysis of one vocal cord was present both before and after thyroidectomy. There was no explanation for the paralysis. Among 163 cases of malignant disease of the thyroid there were 24 instances of paralysis of the vocal cord; in 10 the right vocal cord, in 13 the left vocal cord and in 1 both cords were paralyzed. Carcinoma was contained in an adenoma in only 2 (or 8 per cent) of the cases in which there was paralysis of a vocal cord and in only 3 (or 12 per cent) of the cases in which paralysis of a vocal cord was not present and in which an accurate clinical diagnosis was made but in 38 (or 53 per cent) of the cases in which the true condition was not suspected clinically. Of 57 cases of chronic thyroiditis paralysis of the vocal cord was present in none. When it is difficult to distinguish between a malignant process and chronic thyroiditis, paralysis of the vocal cord should suggest a malignant process.

FOREIGN

An asterisk (*) before a title indicates that the article is abstracted below. Single case reports and trials of new drugs are usually omitted.

British Medical Journal, London

2:681-716 (Nov. 15) 1941

- Hemiprostectomy for Unilateral Adenomatous Enlargement. W. S. Handley.—p. 681.
Methods for Local Application of Sulfanilamide. F. Hawking.—p. 685.
Treatment of Diphtheria Carriers with Sulfathiazole Snuff. A. M. Thomas.—p. 687.
Nutritive Value of Bread: Fortified White Flour and National Wheatmeal Compared. Margaret D. Wright.—p. 689.
*Treatment for Chronic Psoriasis. A. Bigham.—p. 692.

Chronic Psoriasis.—Bigham treated 53 patients with chronic psoriasis by employing a combination of the methods recommended by Madden and by Goeckerman and O'Leary: The patient is told to rub an ointment of 2 per cent crude coal tar in soft petrolatum into all lesions every night. In the morning, in the ultraviolet radiation department, all but a thin film of the ointment is removed with olive oil; then ultraviolet irradiation is carried out. This treatment is given every day. During treatment the patient takes daily 1,000 units of vitamin B₁ by mouth. When the lesions are especially encrusted, 1.3 to 2 Gm. of salicylic acid is added to the tar ointment and the patient is advised to scrub off the scales with a stiff brush or with pumice stone. The ointment is reapplied after this exfoliating treatment and the irradiation carried out. Care should be exercised in treating children by this method, as the danger of lighting up a tuberculous focus exists when young persons are generally irradiated.

Journal of Hygiene, London

41:225-344 (Nov.) 1941

- Human Physiology Under High Pressure: I. Effects of Nitrogen, Carbon Dioxide and Cold. E. M. Case and J. B. S. Haldane.—p. 225.
Further Experiments on Field Vole with Tubercle Bacilli. A. S. Griffith.—p. 250.
Further Experiments on Golden Hamster (*Cricetus Auratus*) with Tubercle Bacilli and Vole Strain of Acid Fast Bacillus (Wells). A. S. Griffith.—p. 260.
Survival of Calmette-Guérin Strain of Tubercle Bacillus (BCG) in Blood and Mammary of Goats. A. S. Griffith.—p. 266.
Atypical Strains of Tubercle Bacilli in Human Tuberculosis. A. S. Griffith.—p. 272.
Susceptibility of Water (or Grass) Snake (*Trepidonotus Natrix*) to Avian Tubercle Bacillus and to Reptilian Strains of Acid Fast Bacilli. A. S. Griffith.—p. 284.
Method of Preserving Strain of Tubercle Bacillus Without Having Recourse to Successive Subcultivation or Injection of Usual Laboratory Animals. A. S. Griffith.—p. 289.
Infection of Adult Cattle with *Mycobacterium Tuberculosis* Avium. R. E. Glover.—p. 290.
*Observations on "Hospital Infection" in Plastic Surgery Ward. E. T. C. Spooner.—p. 320.
Serologic Diagnosis of Glandular Fever (Infectious Mononucleosis): New Technic. A. M. Barrett.—p. 330.

Hospital Infection in Plastic Surgery Ward.—Spooner states that over a period of six months the wounds and throats of patients in a plastic surgery ward were swabbed. Hemolytic streptococci obtained from them were typed; 65 per cent or more of the wounds harbored *Streptococcus pyogenes*, but relatively few of the patients suffered severe damage as a result of the infection. About a fourth of the wounds of the patients admitted to the ward became infected with the streptococcus while the patients were in the ward. Two wound and throat epidemics, one due to type 13 and one to type 4/24 streptococci (agglutinated by serums against both type 4 and type 24), occurred. Measures designed to prevent hospital infection of wounds must be aimed at all infections. Septic fingers and hands among nurses introduce a risk to wounds. Measures must be taken to block obvious channels of infection from one wound to another. It seems probable that the risk of droplet infection from unguarded throats and of contact infection from unguarded fingers is greater than that of air borne infection. The risk of infection from the air is not great for a small wound which is not exposed to the air for many minutes. However, all possible precautions against the risk from dust borne and air borne bacteria should be taken. Patients with facial burns may rapidly become throat carriers, and may thereby contribute a large share to the infection of the dust and air of the ward.

Journal Obst. & Gynaec. of Brit. Empire, Manchester
48:549-684 (Oct.) 1941

- Discussion on Origin of Cysts on Broad Ligament, with Description of Broad Ligament Cyst Which, with Fallopian Tube and Ovary, Had Undergone Torsion. B. Gilbert and B. K. Sheorey.—p. 549.
Puerperal Infection Associated with Hemolytic Streptococci Other Than Lancefield's Group A. A. M. Ramsay and M. Gillespie.—p. 569.
Posterior Pituitary Factor in Toxemias of Pregnancy. C. Mukherjee.—p. 586.
Suture of Perineum Using Local Anesthesia. D. J. N. Smith.—p. 610.
Hyperemesis Gravidarum and High Vitamin Therapy. L. O. Watt.—p. 619.
Antepartum Hemorrhage with Retention of Dead Fetus. A. G. Rutter.—p. 627.
Unusual Tumor of Vulva. B. Solomons.—p. 632.
Pseudovarian Cyst: Case. J. D. Marchant.—p. 635.
Vesicovaginal Fistula of Four Months' Duration Treated by Indwelling Catheter: Case. Gladys H. Dodds.—p. 638.

Journal of Pathology and Bacteriology, Edinburgh
53:327-456 (Nov.) 1941

- Sputum Film Cultures of Tubercle Bacilli: Method for Early Observation of Growth. D. M. Pryce.—p. 327.
Factors Affecting Activity of Toxin of *Clostridium Welchii*. C. L. Oakley and G. Harriet Warback.—p. 335.
Experiments on Drying and Freezing Bacteriophage. Margaret L. Campbell-Renton.—p. 371.
Microscopic Observations on Bacteriophage of *Staphylococcus*. K. B. Eisenberg-Merling.—p. 385.
Agglutination Reactions of Certain Trichomonads in Serums Obtained from Immunized Rabbits, with Particular Reference to *Trichomonas Fetus*. Muriel Robertson.—p. 391.
Obstruction of Renal Tubules in Myelomatosis and in Crush Injuries. J. E. Morison.—p. 403.
Function of Tissue Cells in Mediums Used for Growing Vaccinia Virus. H. B. Maitland and A. W. Laing.—p. 419.
Darkground Studies of Vi Agglutination of *Bacillus Typhosus*. A. Pijper.—p. 431.

Journal of Physiology, Cambridge

100:233-368 (Nov.) 1941. Partial Index

- Ratio Between Antidiuretic and Pressor Activities of Posterior Pituitary Extract Subjected to Mild Hydrolysis. A. M. Fraser.—p. 233.
Method for Estimating Fraction of Volume of Muscle Contained in Vascular System. J. F. Danielli.—p. 239.
Volume of Vascular System and Penetration of Sugars from Vascular System into Intercellular Space. J. F. Danielli and H. Davson.—p. 246.
Investigation of Simple Methods for Diagnosing Vitamin A Deficiency by Measurements of Dark Adaptation. D. J. Dow and D. M. Steven.—p. 256.
Quantitative Method of Assay for Thrombin and Prothrombin. L. B. Jaques.—p. 275.
Strength and Size of Bone in Relation to Calcium Intake. G. H. Bell, D. P. Cuthbertson and J. Orr.—p. 299.

Journal of Royal Army Medical Corps, London

76:189-248 (April) 1941

- Report on Sixth International Course in Malariology, 1939. J. J. O'Dwyer.—p. 189.
*Bacteriologic Researches on Cases of Cerebrospinal Meningitis, Convalescents and Carriers. C. E. van Rooyen and J. C. Morris.—p. 209.
Musings on Medical Evacuation in Mobile Warfare. I. H. Lloyd-Williams.—p. 212.
Appendicitis in India. F. V. Stonham.—p. 214.
Some Hygienic Problems Which Will Follow on Adoption of Mechanization in India. R. A. Anderson.—p. 223.

Bacteriologic Study of Cerebrospinal Meningitis.—Van Rooyen and Morris record the data of a bacteriologic study of the swabs of 200 patients, 113 convalescents and 36 carriers of nasopharyngeal meningococci treated with sulfapyridine. The epidemic occurred in the British Expeditionary Force in 1939-1940. An extremely ill man received 8 Gm. of sulfapyridine daily for two days, 6 Gm. for three days and 3 Gm. daily for five days. A patient with mild symptoms was given 6 Gm. for two days, 4 Gm. for two days and then 2 Gm. for two days. Only 3 patients died. Granulocytopenia, severe hematuria or anuria was not observed, and all the remaining patients recovered completely. Some patients complained of giddiness and fainting during convalescence, in view of which the authors suggest that the minimum period for recuperation from a mild attack of cerebrospinal meningitis should be three months, and that probably all patients who recover should be submitted to a special neurologic examination before they return to duty. No organism could be demonstrated in the films or in the cultures of the nasopharyngeal material from 15 patients with all the

classic signs and symptoms of the disease. Study showed that after the treatment the meningococcus disappeared from the cerebrospinal fluid in twenty-four or more hours, after which the infiltration of polymorphonuclear leukocytes subsided. The lymphocytes and monocytes were the last to disappear. Study of a number of films showed that about twelve hours after the drug was given the organism began to swell, its outline became hazy and the diplococcus formation was lost. This change was most noticeable in the extracellular cocci, which were the first to disappear, followed later by the intracellular cocci; on the second day of treatment most of the organisms were scarcely recognizable as meningococci. Of 36 soldiers with meningococci in the nasopharynx who were given 3 Gm. of sulfanilamide daily for six days 35 responded, and on the eighth day no meningococci were present. The remaining carrier despite local treatment continued to harbor the organism for several weeks and even resisted a second course of sulfanilamide. An estimate of the carrier rate was obtained from the data of tests on 107 contacts; in 30 the results were positive. Of 113 patients swabbed twice after treatment but prior to discharge from the hospital only 3 harbored the meningococcus. These 3 may have been resistant to sulfapyridine or they may have become reinfected. Apart from causing the meningococcus to disappear from the nasopharynx of most convalescent persons and carriers the drug appeared to diminish the incidence of other potentially pathogenic bacteria normally present in the nasopharynx. Sixty-two strains of meningococcus were isolated from the patients; sixty were agglutinable by group I but not by group II serum. The earliest sign of an agglutination reaction was observed in the serum of 1 patient on the seventh day of illness for his own group I meningococcus and for another strain from another patient, in an end titer of 1:30. No cross agglutinin for group II meningococci was observed. The last time agglutinins could be demonstrated in a patient's blood was on the forty-ninth day, when a 1:30 dilution gave a positive result. The highest agglutination response usually occurred at about the twenty-first day of illness, when the serum frequently reacted in a dilution varying from 1:120 to 1:240. In some patients and convalescents agglutinins could not be demonstrated at any stage of the illness. For this the authors have no explanation except to suggest that the rapidity with which sulfapyridine acted did not permit them to develop. Six patients had acute tonsillitis accompanied by pharyngitis due to the meningococcus; only 4 of them were repeatedly exposed to the infection. The appearance of the throat and fauces was not unlike that observed in early acute streptococcal tonsillitis. The 6 patients responded to treatment with sulfapyridine and were discharged to duty in ten days. A profuse growth of group I meningococci was isolated from 4 patients and a mixed growth of meningococci and *Streptococcus viridans* from the other 2.

Lancet, London

2:587-624 (Nov. 15) 1941

- Medicine and Duty. T. B. Layton.—p. 587.
Epidemic Neonatal Diarrhea in Maternity Hospitals: I. Clinical Aspect. G. Ormiston.—p. 588.
Id.: II. Bacteriologic Aspect. N. Crowley, F. Fulton, A. W. Downie and G. S. Wilson.—p. 590.
Nephrectomy in Unilateral Renal Disease with Hypertension. G. O. Richardson and G. A. Smart.—p. 594.
*Black Currant Purée as Source of Vitamin C. W. W. Payne and Elizabeth Topley.—p. 596.
Lupus Erythematosus and Tuberculin Tests. J. Kelvin.—p. 597.
Prevention of Droplet Borne Infections by Spray: Field Experiment. D. S. Middleton and I. C. Gilliland.—p. 598.
Biopsy of Endometrium. J. Hawkins.—p. 599.
*Toxicity of Phenothiazine. D. Hubble.—p. 600.
Insulin Hypoglycemia: Changes in Nervous Manifestations. R. D. Lawrence.—p. 602.

Black Currant Purée as Source of Vitamin C.—Payne and Topley determined the minimal dose of vitamin C in the form of a black currant purée as a substitute for orange juice that was required by 59 children 3 to 12 years of age to supplement the routine diet in some children's wards of an emergency medical service hospital. During the winter and spring the diet at the hospital was as good as the local food position allowed and probably better than that of many children in the country at the time. Nevertheless the daily vitamin C intake furnished by the diet was unlikely to exceed 5 mg. of ascorbic acid and that only if the children ate up all their ration of

greens. In 1 child, who had been in the hospital for several months, mild clinical scurvy developed. Not 1 of the 59 children had a saturation level of the acid. Such a level was reached by giving the children synthetic ascorbic acid; then a purée of black currants was given as a dietary supplement, and the level at which saturation could be maintained was determined. The daily maintenance dose of the purée varied from 15 to 6 mg. of ascorbic acid to 14 pounds (6.4 Kg.) of body weight according to age, corresponding to an average daily dose of 1½ to 2 ounces (45 to 60 cc.) of the purée per child.

Toxicity of Phenothiazine.—Hubble states that, although phenothiazine has proved an effective remedy against the threadworm infection of more than 30 persons, it is probably too dangerous a drug to be used as routine therapy; anemia and toxic hepatitis have followed its use. Much smaller doses of phenothiazine are poisonous to the blood and the liver than have been suggested (1 Gm. daily for seven days for children aged up to 4 years, 2 Gm. for those between 4 and 8 and 8 Gm. for adults) for the treatment of threadworm infection. The author adds 3 instances of anemia to the 3 already reported. He reports also the occurrence of toxic hepatitis in 2 of the children following treatment with phenothiazine. He suggests that in the future its use should be restricted to patients for whom less dangerous therapy has repeatedly failed.

Monatsschrift für Psychiatrie und Neurologie, Basel

104:129-192 (No. 3) 1941. Partial Index

- Subacute Ascending Polyradiculoneuritis. L. van Bogaert.—p. 129.
Ventriculometry. F. Morel and R. de Montmollin.—p. 150.
*Therapeutic Experiments with Phenytoin Sodium in Epilepsy. K. Gyárfás and B. Horányi-Hechst.—p. 179.

Phenytoin Sodium in Epilepsy.—Gyárfás and Horányi-Hechst point out that Putnam and Merrit found that phenytoin sodium had the strongest spasmolytic and the least narcotic effect among five different substances. The authors report their experiences with this substance in ambulatory patients who for long periods had had frequent attacks of grand mal and had shown no improvement in response to therapy with bromides or barbiturates or to dietetic measures. The patients' mode of living was not changed during medication with phenytoin sodium. The majority of the patients had genuine epilepsy. Of 57, 20, or more than a third, were completely freed from their attacks. In another third considerable improvement was obtained. The patients emphasized that the remedy had no narcotic or stupefying effect and that it improved their working capacity. Observations on rabbits disclosed that phenytoin sodium causes hepatic lesions but that the simultaneous administration of sodium thio-sulfate prevents them. Phenytoin sodium given in not too large doses and combined with phenobarbital is effective and free from noxious effects. It is indicated in cases of severe grand mal epilepsy in which medical control is possible.

Schweizerische medizinische Wochenschrift, Basel

71:1169-1192 (Oct. 11) 1941. Partial Index

- *Laënnec's Hepatic Cirrhosis. F. Wuhmann.—p. 1169.
*Hepatic Cirrhosis and Pernicious Anemia. H. W. Hotz.—p. 1173.
Observations on Etiology of Stimulus Conduction Disturbances of Heart. E. Attinger.—p. 1176.
Treatment of Secondary Anemias with New Type of Reduced Iron. L. Feil.—p. 1180.
Results of Treatment of Postencephalitic Parkinsonism with Belladonna Root Extract. H. D. von Witzleben.—p. 1183.

Laënnec's Cirrhosis.—Wuhmann directs attention to the comparatively high frequency of hepatic cirrhosis in Switzerland. Necropsies at the Zurich clinic revealed the disease in 11 per cent of the subjects (7.5 per cent of women and 14.5 per cent of men). Observations on 150 cases are presented. In 50 cases hepatic cirrhosis was the principal lesion; in the rest it was discovered accidentally. There were 106 men and 44 women; 54 were in the first, the so-called insular, stage and 34 in the more advanced interinsular stage; 62 presented the typical picture of severe cirrhosis. The history of his patients disclosed the use of alcohol by 91 per cent and its abuse by 82 per cent. Tuberculosis, brucella abortus infection and syphilis were not present. In approximately one third of the cases the disease began with digestive disorders, in another third with circulatory disturbances and in 19 cases with pulmonary tuberculosis. In only 60 cases (40 per cent) was the disorder correctly diagnosed.

In an additional 16 (11 per cent) it was suspected. In half of the cases the condition was not suspected. Typical behavior of the male patients is characterized by euphoric mood, emotional instability and increasing loss of memory. It is noteworthy how well cirrhotic patients tolerate the severe disturbances of the advanced stages of the disease. Female patients with cirrhosis not infrequently are uncommunicative and display a negativism associated with defiance or spite. Patients with hepatic cirrhosis frequently exhibit hypotrichosis of the trunk, thick hair on the head, a feminine type of hair growth in the pubic region, lack of axillary hair and star shaped cutaneous telangiectases particularly on the upper part of the trunk, and are usually of the pyknic constitutional type with lively temperament. Jaundice was lacking in more than half of the cases. The Takata-Ara reaction was positive in only about half of the cases that came to necropsy. The heat coagulation band test of Weltmann and the erythrocyte sedimentation test proved valuable in the diagnosis and prognosis. The galactose tolerance test and the demonstration of increased urobilin in the urine are of great value.

Hepatic Cirrhosis and Pernicious Anemia—According to Hotz, hyperchromic macrocytic anemia occurs in patients with hepatic cirrhosis. Many observers deny that the pernicious type of anemia can develop on the basis of hepatic cirrhosis. Hotz was able to demonstrate the hematic and medullary morphology of pernicious hemopoiesis and its responsiveness to liver extract in 22 cases of cirrhosis (19 of Lacméc's type and 3 of hemochromatosis). The unique position of this "pernicious cirrhosis" compared to cryptogenic (Biermei's) pernicious anemia is proved on the one hand by certain hematologic differences and on the other hand by the frequent preservation of the gastric hydrochloric acid secretion and the occurrence of prolonged remissions without liver therapy. The author's cases were characterized by the frequent occurrence of disturbances in fat absorption, which became manifest in periodic occurrences of fat diarrhea and usually led to a relapse of anemia. The author suggests that the pernicious cirrhosis anemia is caused by a complex disturbance of the metabolism of the antiperniciousa principle (1) by a deficient formation of Castle's endogenous factor owing to a disturbance in the gastric secretion, (2) by inhibition of the resorption of the deficiently formed antiperniciousa principle as the result of impaired intestinal absorption and (3) by impairment of the storage function of the cirrhotic liver for the antiperniciousa principle.

Bollettino d. Soc. Ital. di Microbiol., Milan

13:79-102 (July-Aug.) 1941 Partial Index

*Action of Staphylococcus Toxin on Sugar Metabolism. C. Florio—p. 48

Action of Staphylococcus Toxin on Sugar Metabolism.—Florio inoculated rabbits with a staphylococcus toxin by the subcutaneous or the intravenous route and found that the toxin exerts a hypoglycemic effect. Inoculation with a fatal dose is followed by a progressive fall in the blood sugar, which reaches a low level a few hours before death. Hypoglycemia is transient after a subfatal dose and corresponds to the dose administered. The glycemia is independent of the temperature. Intravenous injection of dextrose immediately after inoculation prolongs the life of animals and attenuates symptoms of poisoning. Immunization with toxoid makes the animals resistant to a fatal dose of toxin. The animals exhibit transient hypoglycemia, which is compensated spontaneously. The reaction of an immunized animal to a fatal dose of toxin is similar to that of a nonimmunized animal to a subfatal dose of the toxin.

An. Soc. Mex. de Oftalmología, etc., Mexico, D. F.

16:189-252 (July-Aug.) 1941 Partial Index

*Optic Neuritis in Pellagra. L. Mendoza Gonzalez—p. 189

Optic Neuritis in Pellagra—Mendoza Gonzalez observed optic neuritis in 7 of a large group of pellagrous patients. This type of neuritis has not been previously reported. Three patients were alcoholic addicts. Two of these presented alterations in the central vision and photophobia. The third alcoholic addict presented a picture of optic neuritis. Two patients had amblyopia without the ophthalmologic picture of optic neuritis,

and 2 had diminished visual acuity and visual reduction of the temporal fields. Proper diet and the administration of nicotinic acid effected great improvement in the pellagra symptoms. They had no effect on the visual symptoms of optic neuritis. These improved on oral and parenteral administration of thiamine hydrochloride and the use of a diet rich in vitamin B₁. The patients were also given extracts of gastric mucosa to stimulate proper absorption of vitamin B₁.

Revista Clínica Española, Madrid

3:189-284 (Sept.) 1941 Partial Index

Hunger Idem. V. Gilman Garcia—p. 189
Spirography in Functional Tests of Respiratory and Cardiovascular Apparatus. H. Olmes de Carrasco—p. 197
*Ulnar Neuritis Due to Arthritis of Elbow. C. Jimenez Diaz, E. Rola and V. Gilman—p. 205
Dienecephalic Factor in Pathogenesis of Hypertension. P. Rodrigo Sallette—p. 211
Study of Sinus Pericranii. R. V. Lopez and V. Meana Negrete—p. 215
Studies on Blood During Pregnancy, Labor and Puerperium in Women with Pregnancy Toxemia. I. Orengo Diaz del Castillo—p. 220
Should Roentgen Census be One of Principal Duties of Antituberculosis Dispensary? R. Navarro Gutierrez and F. Paz Espeso—p. 228

Ulnar Neuritis Due to Arthritis of Elbow.—Jimenez Diaz and his collaborators report the case of a railroad worker aged 50 who presented paresthesia of the right hand limited to the little finger and the ring finger, atrophy of the muscles and progressive difficulty in the use of the two fingers. Examination demonstrated ulnar neuritis. Serologic tests and blood studies provided no etiologic clues. A roentgenogram of the elbow disclosed proliferating arthritis deformans of the joint, particularly pronounced about the epitrochlear canal. A similar condition was observed in a man aged 51. The authors stress the rather high incidence of arthritis of the elbow, in certain occupations. A knowledge of the association of ulnar neuritis with arthritis of the elbow is important for the treatment. The nerve should be displaced from the epitrochlear canal to the anterior surface of the forearm, thereby removing the cause of the disorder.

3:285-380 (Oct.) 1941 Partial Index

Mikroind Neurodiagnostik und Its Hereditary Transmission (Heredity of Heredity). C. Jimenez Diaz and J. C. de Oya—p. 296
Investigations on Lathyrism. C. Jimenez Diaz—p. 303
Adrenocortical Endocrine Correlations. J. Botella Llusia—p. 309
*Total Thyroidectomy in Pulmonary Tuberculosis. M. Soriano Jimenez—p. 313
Sclerosing Factor in Pulmonary Silicosis. L. Ramallal Rumbó—p. 322
Muscular Spasm as Deficiency Symptom. J. Raf. Carballo—p. 335
Nature of Hematic Glycolysis. J. Souto Candeira and F. Grande Covian—p. 336
Treatment of Malaria Fever, with Particular Consideration of Gold Therapy. P. Arevalo Seco—p. 340

Total Thyroidectomy in Pulmonary Tuberculosis—Soriano Jimenez performed total thyroidectomy on 21 patients with advanced, bilateral, severe pulmonary tuberculosis in whom all other therapeutic measures had failed. The aim of the operation was to reduce the metabolic rate and increase the body weight and the defensive power. The operation was performed with the aid of local anesthesia and was well tolerated. Four types of response were noted. In the first type the rapid gain in weight was accompanied by great improvement in the general condition and by a progressive involution of the tuberculous lesions. This type of reaction was observed chiefly in patients with relatively recent infection (incurred one to three years before), particularly in the presence of hematogenic dissemination and new cavities with thin walls. In the second type the initial gain in weight was followed by a progressive loss leading to the death of the patient. The tuberculous lesions showed the same behavior after an initial involution there was a progressive spread. In the third type the weight increased for a time and later decreased, but the progressive course of the lesions did not change. In the fourth type there was no gain in weight and no arrest of the disease. The author suggests that total thyroidectomy be performed earlier in the disease. The operation should be done as soon as it is realized that other therapeutic methods are ineffective. Thus it may be possible to perform the operation when the reactive powers of the organism are still comparatively good, particularly in patients with the bilateral, hematogenic, subacute forms and in those with repeated exacerbations and a tendency to ulceration.

Revista de Cirurgia de São Paulo

7:93-196 (Sept.-Oct.) 1941. Partial Index

- *Therapy of Pyelonephritis. J. Martins Costa and A. A. da Motta Pacheco.—p. 137.
*Roentgen Irradiation in Hidradenitis. C. Fried.—p. 187.

Therapy of Pyelonephritis.—According to Martins Costa and Pacheco sulfonamide derivatives, especially sulfathiazole, control infection in pyelonephritis provided the urinary retention is relieved. The authors advise daily transfusion of 100 cc. of blood. Transurethral-ureteral drainage is of value in stimulating urination and controlling retention. Ureteral drainage is maintained as long as the symptoms are acute. Three cc. of a 1 per cent silver nitrate solution is instilled through the catheter daily. As a rule the acute symptoms and fever abate in two or three days. A focal infection can be the causal agent and should be removed. Inflammatory lesions of the genito-urinary adnexa in patients of either sex can be controlled by conservative treatment. Infected vesical diverticula, infected tonsils, dental abscesses and furuncles should be removed and sinusitis treated. Stasis may be treated by blocking or by denervation of the renal sympathetic nerves. If urinary retention is caused by a mechanical obstacle, the obstacle should be removed. This may call for fixation, replacing a movable kidney, removal of calculi, plastic correction of a ureteral stricture or ligation and sectioning of aberrant vessels.

Roentgen Irradiation in Hidradenitis.—Fried administered three to six roentgen irradiations of 120 to 160 roentgens to the axilla. The skin was cleansed before the irradiation and pure petrolatum or zinc oxide ointment was applied. In cases of acute inflammation wet applications were used and the arms were kept immobilized in the course of the treatment. When the treatment is begun early in the course of the disease the adenitis regresses without recurrence. Abscesses become rapidly delimited and may be emptied by punctiform incisions. Fever abates, and inflammation and infiltration rapidly regress. In cases in which new furuncles formed after surgical treatment the lesions were rapidly controlled by roentgen therapy. No recurrences were noted.

Revista de la Facultad de Medicina, Bogotá

10:191-280 (Sept.) 1941. Partial Index

- *Ayerza's Disease. G. Toro Villa.—p. 242.

Ayerza's Disease.—On the basis of clinical and electrocardiographic studies of 6 cases of the Ayerza syndrome Toro Villa concludes that the disease presents three developmental stages: (1) an early stage of chronic bronchitis with or without dilatation of the bronchi and peribronchial sclerosis, (2) a stage of pulmonary or bronchopulmonary disease with cough and dyspnea and, later, pulmonary emphysema, sclerosis, cyanosis and somnolence, and (3) cardiac disease with terminal insufficiency. The clinical symptoms correspond to the stage at which the patient is observed. This fact gives rise to the differences in the opinions found in the literature.

Deutsche medizinische Wochenschrift, Leipzig

67:831-858 (Aug. 1) 1941. Partial Index

- Task of General Surgeon in War Injuries of Ear and Upper Air Passages Until Care by Otorhinolaryngologist. L. B. Seifert.—p. 831.
Rare Thoracic-Abdominal Gunshot Injury. Pfister.—p. 836.
Scarlet Fever Prophylaxis with New Vaccine. F. Faragó.—p. 837.
*Frequency of Menstrual Cutaneous Changes. K.-H. Schölzke.—p. 842.

Frequency of Menstrual Changes of Skin.—Schölzke noted the occurrence of cutaneous disorders in 378 women among 1,000 studied. The ages varied from 14 to 50. In the majority of women cutaneous eruptions developed about three and one-half days before menstruation; with the onset of the flow the lesions subsided abruptly or gradually. The cutaneous changes were of various types. Herpetic eruptions on the external genitalia, the thighs or the face were observed in 19; 18 women reported groups of vesicles in the region of the lip and one woman vesicles in the region of the left forearm. In 17, red, sometimes itching and scaling, spots appeared on the face. Five women had urticarial lesions; 2 had circumscribed edema, particularly in the region of the eyelids; 3 had itching over the entire body, and 1 presented changes resembling those of dermatitis dysmenorrhoeica. About one third of women with

cutaneous menstrual disorders presented changes of the acne vulgaris type; the lesions were usually few in number but recurred nearly always in identical regions. They were most frequent on the chin, around the mouth and on the forehead, cheeks, nose, chest and back. In older women the lesions were often of the rosacea type. The menstrual changes of the skin did not always persist throughout life with the same intensity. The author investigated also how existing cutaneous lesions in 123 of the 1,000 examined women were influenced by menstruation. The high incidence of acne vulgaris (107 cases) is ascribed to the fact that a large proportion were of puberal age. The average age of patients with acne vulgaris was 20¼ years. In nearly half (24) of the 49 women with severe acne, menstruation was found to exert an influence (improvement in 9, exacerbation in 15). Of the 58 with mild acne 17 showed menstrual modifications (15 showed exacerbations). The menstrual cutaneous changes are usually most severe when the ovary produces little estrogenic hormone (immediately before menstruation) and subside when large amounts of this hormone are produced.

Zentralblatt für Chirurgie, Leipzig

68:1233-1280 (July 5) 1941

- Early Diagnosis and Treatment of Impairment of Blood Perfusion. P. Sunder-Plassmann.—p. 1234.
*Experiences with Transfusion of Conserved Blood. J. Hohenwallner.—p. 1257.

Transfusion of Conserved Blood.—Hohenwallner reports observations on 120 transfusions of conserved blood. The average age of the conserved blood was eight days, but as a rule the blood was less than two weeks old; in 6 cases it was between fifteen and thirty-five days old. In all of these the transfusions were tolerated without a reaction. During the same period 236 transfusions of fresh blood were made. There was no great difference with regard to tolerability. Increases in temperature up to 2 degrees centigrade were observed in 24 patients who had received a fresh blood transfusion and in 11 who had been given conserved food. Chills occurred after 3 transfusions of fresh blood and after 2 of conserved blood. All these manifestations subsided rapidly and did not lead to serious complications. The author prefers to administer blood of the same group and preferably from blood relatives. In this respect the author differs from Schilling, who uses only blood of group O for conservation. Two methods of infusion were used with the conserved blood: (1) venous puncture and (2) continuous drip infusion. The use of conserved blood is chiefly indicated (1) as a blood substitute in hemorrhage, (2) to combat acute post-operative failure of the circulation and shock, (3) as a preparation to an operation, (4) to improve a poor general condition (cachexia) and (5) to combat sepsis. Conserved blood is not as valuable as fresh blood. The conserved blood method is especially valuable in small hospitals which have no organized donor service.

Acta Medica Scandinavica, Stockholm

108:483-616 (Oct. 8) 1941. Partial Index

- Pernicious Anemia of Pregnancy: Clinical and Hematologic Study. Elsa Segerdahl.—p. 483.
*Buerger's Disease, Thromboangiitis Obliterans, in the Brain: Report of Three (Four) Cases. N. Antoni.—p. 502.
Effect of Schaumann's Disease on the Heart and Its Mechanism. W. T. Longcope and A. M. Fisher.—p. 529.
Cushing's Disease: Case. F. S. P. van Buchem.—p. 544.
*Hepatitis Chronica in Younger Persons. L. Abramson.—p. 561.
Coproporphyrinuria and Hemoglobin Metabolism in Experimental Lead Poisoning. S. E. Björkman.—p. 568.
Finger Tremor and Alpha Waves of Electroencephalogram. T. Lindqvist.—p. 580.

Thromboangiitis Obliterans in Brain.—Antoni reports 4 cases of thromboangiitis obliterans of the brain. The cerebral form of Buerger's disease is not rare; many patients thought to have juvenile arteriosclerosis probably suffer from this condition. The possibility of the existence of this disorder should be thought of when there are symptoms of cerebral disorder in young persons, especially if the attacks are many and fleeting and if the same focal sign disappears and recurs. Intermittent claudication associated with repeated cerebral attacks and perhaps cardiac disorder should always lead to the suspicion of Buerger's disease. Resection of cervical ganglions and periarterial sympathectomy led to improvement in 4 cases reported from the Foerster clinic. A collection of 948 cases from the

Mayo Clinic in 1938 reveals that sympathectomy does not cure the disease. If thrombosis is primary, the effects of heparin treatment should be tested. It is possible that the disease is a form of hypoheparinemia. The ages at the onset of symptoms in the author's cases were 36, 46 and 47 years, respectively. One patient had typical intermittent claudication with a feeble pulse in the legs; the rest presented no signs of disorder in the vessels of the extremities. The total duration of the disease was four months, one year and eight years, respectively. The neurologic disorders in all 3 cases were predominantly of the hemispherical type: monoplegia, hemiplegia, flimmer scotomas, hemianopia and aphasia. The heart and the aorta were normal or only slightly changed, but there was obliteration of one internal carotid artery (the right in 1 case and the left in 2). The moderate sized and small arteries in the inner parts of the brain and on the convexity showed typical lesions in 2 cases, but in the third case, despite grave clinical symptoms and foci of softening in the cortex, the distal cerebral arteries were intact. The severe periarteritis, around the cervical portion of the internal carotid artery, in case 3 is worthy of note. The adventitia of the arteries showed occasional signs of inflammation. The leptomeninges were greatly thickened over the foci and, to a lesser degree, in their proximity.

Chronic Hepatitis in Young Persons.—Abramson found 10 cases of chronic hepatitis of the young in a hospital material exceeding 10,000 cases of internal disorders. The chief symptom was icteric discoloration of the scleras. The disorder is not as rare as the aforementioned figures seem to indicate. If patients with indefinite dyspeptic disorders in whom routine examination of stomach, intestine, biliary system and pancreas gave negative results had been examined with more sensitive tests of the hepatic function, more cases of chronic hepatitis might have been found. The icteric discoloration of the scleras and possibly of the face is usually faint and may escape observation. The urine gives positive urobilinogen and urobilin reactions, but in some cases these are positive only during the more acute stage. Meulengracht's icteric index of the serum is constantly pathologic. Takata's reaction is positive. The galactose test gave a positive result in only 2 of 7 of the author's patients. The period of observation was between two and seven years. The ages of the patients varied between 20 and 42; 7 were less than 28. All were men. The subjective symptoms were fairly uniform, consisting of pain and burning in the epigastric region, particularly after the eating of rich and heavy foods. Abundant formation of gas and diarrhea occurred in some cases. The patient or those around him never observed the icterus. Predominant features of the morbid picture were fatigue, listlessness and depression. The disturbances increased after physical exertion, and several of the patients were incapacitated for two years or longer and had to change their occupation to one involving less physical exertion. Treatment never completely relieved all symptoms. The prognosis is uncertain, and a later development of cirrhosis is possible. The cause is likewise obscure. Although the literature suggests acute hepatitis as a possible cause, the majority of the author's patients had no history of acute hepatitis.

Nordisk Medicin, Stockholm

12:2857-2922 (Oct. 11) 1941. Partial Index

Finska Läkaresällskapetets Handlingar

Contribution to Question of Mechanism of Origin of Pernicious Tape-worm Anemia: Experimental Investigation. B. von Bonsdorff. —p. 2877.

*Treatment of Celiac Disease with Injections of Human Blood. J. Wickström. —p. 2889.

Case of Tumor Resembling Blood Cyst in Rectum of Premature Infant. B.-Å. Söderlund. —p. 2895.

Treatment of Celiac Disease with Injections of Human Blood.—Wickström reports 5 cases of celiac disease in which treatment with blood transfusions exclusively was followed by considerable improvement in the general condition. Increase in weight, with more even rise in the weight curve, increased tissue turgor, better appetite and better disposition resulted. Intestinal activity was not improved to the same degree, and the results of the sugar tolerance tests and the serum phosphate values were unchanged. The author considers the transfusion treatment of celiac disease especially indicated for patients with

poor general condition and with pronounced loss of weight and suggests that perhaps a factor is thus administered which in some way affects the intermediary metabolism and leads to a normal utilization of the food.

Hygiea

*Sulfanilamide and Sulfapyridine in Pulmonary Tuberculosis. O. Nilsson. —p. 2899.

Spondylolisthesis and Traumatic Displacement of Vertebra. I. Hermodsson. —p. 2901.

Are Seasonal Variations in Occurrence of Certain Diseases Related to Vitamin Content of People's Food? N. Alwall. —p. 2904.

Sulfanilamide and Sulfapyridine in Pulmonary Tuberculosis.—From his observations in 23 cases of pulmonary tuberculosis in which sulfanilamide or sulfapyridine was given either before admission, usually because of a mistaken diagnosis of acute pneumonia, or during sanatorium treatment, because of complications with acute pneumonia, bronchopneumonia, cystopyelitis and other conditions, Nilsson concludes that these agents exert no unfavorable effect on the tuberculous process.

12:3051-3146 (Nov. 1) 1941. Partial Index

Medicinsk Revue

Chronic Typhoid (Paratyphoid B) Carriers and Their Treatment: V. T. M. Vogelsang. —p. 3065.

Chronic Erythroblastosis in Adults, Affections with Distinctive Clinical and Hematologic Characteristics. P. Hanssen. —p. 3080.

Quantitative Sulfapyridine Determination: Preliminary Report. A. B. Aubert. —p. 3086.

Is Catarrhal Jaundice (Acute Hepatitis) Often Followed by Permanent Injury? C. Rosendahl. —p. 3091.

*Idiopathic Hemorrhagic Sarcoma (Kaposi's Sarcoma). A. Jacobsen. —p. 3095.

Idiopathic Hemorrhagic Sarcoma.—Jacobsen reports a case of sarcoma idiopathicum hemorrhagicum in a Norwegian woman aged 65, with relatively rare localization to the face and with roentgenologically established large defects in the frontal bone and the nasal bone. Destruction of the skull in this disorder has not previously been described (Kren). The patient's face had become monstrously deformed by a confluent tumor as hard as cartilage, localized in the greater part of the face and the left side of the lower jaw. Biopsy revealed typical Kaposi's sarcoma. After roentgen treatment in three series, 4,750 roentgens being given altogether, the patient's face has become nearly normal; the skin is slightly atrophic, with some enlarged veins, and is faintly bluish. The defects of the skull have largely filled out, and the patient feels well. Jacobsen says Kaposi's sarcoma occurs in twelve times as many men as it does in women, usually in patients over 50, rarely in patients under 40, mainly in Italians, next in Russians, Poles and Jews and rarely in Teutonic peoples. It generally appears symmetrically with multiple spots and nodes, with the onset as a rule in the extremities, and gradually spreads. The confluence of nodes may lead to large infiltrations. Nodes and infiltrations may ulcerate. The disease is primarily cutaneous, but nodes and infiltrations may develop in almost any organ. Striated and smooth musculature are apparently resistant to the process, and localization to the central nervous system seems to be unknown. Occasionally the bony system may be affected, especially in the hands and feet, where the phalanges may be completely destroyed. The course is chronic. Death results from the disease or from intercurrent disease in from two to three, up to twenty, even up to forty-eight years after the onset. Histologically the changes in the skin and the internal organs consist of distention and neoformation of capillaries, followed by proliferation of characteristic round cells, with numerous small hemorrhages and pigmentation and finally regressive changes with scarlike involution of the pathologic parts. When vascular changes predominate, soft, hemangioma-like formations occur; when the round cells predominate the nodes become hard and fibroma-like. In cases of doubtful diagnosis microscopic examination affords the best aid. Neither excision nor electrocoagulation prevents recurrence or spread, but surgical intervention may be indicated in cases of suppuration, gangrene or extensive destruction of bone. Arsenic also, in the form of neoarsphenamine, seems often to be noticeably effective in causing the cutaneous changes to disappear and in preventing local recurrence. Finsen light and quartz light have given encouraging results. According to Kren the best therapy is roentgen irradiation, given alone or in combination with arsenotherapy.

Book Notices

Surgery of Modern Warfare. By Sixty-Five Contributors. Edited by Hamilton Bailey, F.R.C.S., Surgeon, Royal Northern Hospital, London, etc. In Two Volumes. Volume II. Cloth. Price, \$10. Pp. 481-899, with 326 illustrations. Baltimore: William Wood & Company, 1941.

Volume I of this work has already been reviewed. The whole is a presentation of the surgical problems presented by the injuries incident to enemy action from whatever source. The many contributors are British surgeons in the main well known to students of surgical literature, thus insuring a broad and authoritative presentation of the many problems of mass trauma. In the second volume the discussion centers more on fields of civilian specialization. In section VIII the discussion of wounds of bones and joints is completed. Section IX deals with wounds of the face and neck, including those of the special senses. Section X discusses wounds of the central nervous system and its covering, with special reference to injuries of the brain and skull, war injuries of the spine and cord and the management of the bladder in spinal injuries. There is a section on surgical diseases encountered in subtropical countries and one on administration. This last mentions details of handling patients in military, naval and civilian action, all based on practical experience in these fields of activity.

A large appendix is written by the editor to amplify the text, cover omissions, answer criticism and bring the subject up to date in relation to the recent literature. The book is profusely illustrated, attractively printed and entirely adequate to its purpose. It is not final in its conclusions, since the whole subject of treatment is in flux, but it does give sound surgical principles on which any final definite treatment will be erected. No one section will be complete for civilian specialists in that field but, since specialization is a luxury in war except for the rear areas, the treatment of special fields of surgery will be helpful to those who are not specialists or for those who must cease to be specialists under force of events.

The volumes are for the library and are worthy of a place in all such collections dealing with the surgery of war. There have appeared criticisms of books dealing with military surgery in that they do not fit the pocket of the military tunic. This seems an unfair criticism, since it is exceptional for any one acting in a field of intellectual endeavor to carry his knowledge in the pocket rather than in the head.

These volumes, representing as they do the present day experience of a group of surgeons for whose ability we must have respect, can be read with profit and interest by all who may be called from the walk of civilian surgery to care for those injured by the varied and manifold methods devised by the ingenuity of minds responsible for what is called enemy action.

Der Energiehaushalt unter Einwirkung von Aminosäuren bei verschiedener Ernährung. I. Der Einfluss des Glykokolls bei Hund und Ratte. Von Curt Oehme. Eingereicht am 1. August 1940. Sitzungsberichte der Heidelberger Akademie der Wissenschaften. Mathematisch-naturwissenschaftliche Klasse. Jahrgang 1940. 7. Abhandlung. Paper. Price 5.50 marks. Pp. 78. Heidelberg: Kommissionsverlag der Weissen Universitätsbuchhandlung Heidelberg, 1940.

This monograph bids fair to become a new chapter in nutrition. The author had previously proved that guinea pigs, rats and rabbits in certain nutritive states show a decreased oxygen consumption and an increased respiratory quotient when any amino acid of group 1 is fed—aminoacetic acid, alanine, leucine, isoleucine, phenylalanine, tyrosine, glutamic acid or aspartic acid. Under similar conditions the reverse effects were produced by members of group 2—tryptophan, valine, arginine and histidine. Either effect can be suppressed by administering a suitable quantity of an amino acid of the other group, the compensation rule for amino acids.

The present report covers experiments of two and one-half years' duration on 4 mature dogs. A constant level of oxygen consumption and a constant respiratory quotient were established with the dogs on an aminoacetic acid poor diet, made up of skim milk, potato, fat, vitamins and other foods. Measurements were made when the dogs were fasting. When this state was

attained the daily administration of 10 mg. of aminoacetic acid per hundred grams of body weight decreased the oxygen consumption during a period of some days by 35 to 38 per cent. If the diet contained somewhat more aminoacetic acid and calories, the effect of a supplement of aminoacetic acid was less. As the basal metabolic rate decreased the respiratory quotient increased. Similar effects were seen when aminoacetic acid was administered to starving dogs. Adding histidine reduces the effects produced by aminoacetic acid. Analysis of the energy balance indicates that the considerable changes in basal energy exchanges are chiefly adjusted through the opposed variable dynamic actions of various food components. For example, the primary and secondary specific dynamic effects of carbohydrate are significantly increased when the basal metabolic rate has been reduced by the feeding of aminoacetic acid. With the reduced basal metabolic rate seen in the postabsorptive state there is no accompanying change in oxygen consumption in the fed animal: the picture gradually develops during the twenty-four hours after the last meal.

The hypothesis is advanced that the processes by which protein is utilized during starvation, including particularly the action on the parts of the molecule that can yield carbohydrate and/or fat, are influenced in different ways by aminoacetic acid and members of its group as contrasted with members of group 2. Aminoacetic acid effects a sparing of energy by favoring carbohydrate components, while members of group 2 have an opposite effect. It is suggested that the compensation rule referred to may provide a new criterion for evaluating proteins. An unexplained phenomenon revealed in the tabulated data is the maintenance of virtually constant weight during periods of starvation lasting as long as two weeks. One wonders whether some sympathetic assistant smuggled food to the hungry dogs. While no mention is made of practical application of these data in Germany, it is not improbable that it has been attempted, particularly since aminoacetic acid is easily synthesized. This report is worthy of the attention of experts on nutrition not only because it appears to be a meritorious study but also because of its practical implications.

Treatment of the Patient Past Fifty. By Ernst P. Boas, M.D., Associate Physician, Mount Sinai Hospital, New York City. Cloth. Price, \$4. Pp. 324, with 19 illustrations. Chicago: Year Book Publishers, Inc., 1941.

Recognition of the increasing importance of geriatrics is spreading quickly. Students of this field of medical practice appreciate that there are special problems in dealing with older people as well as certain diseases which occur more frequently in the aged than in younger adults. Normal aging brings many functional, structural and mental changes, some obvious and other occult. These changes affect the course, prognosis, symptomatology and treatment of disease. They also alter the normal; normality is not a fixed point but a series of variables changing with age. The aged present characteristics peculiar to their senescence. Dr. Boas, in this splendid little book, clearly recognizes these distinctions and keeps them in mind throughout his discussions of disorders of the various systems. The volume attempts to cover a tremendous amount of ground. Of necessity, some of the discussions are sketchy; this is particularly true of the chapters on the aging processes and the general management of the aged. However, the style is concise, many of the statements are precise and the factual data and suggestions are highly sound. Few clinicians today are equipped to prepare a systematic discussion of all the problems in any given field of medical practice; Dr. Boas reveals a remarkably broad understanding and presents his material in a lucid and exceptionally readable manner. The discussions of cardiovascular diseases are excellent; there are many eminently practical suggestions. Asymmetry in presentation, however, is apparent; more than a hundred pages are devoted to cardiovascular disease, but disorders of the nervous system are merely touched on in eight pages. The volume is well printed and well bound. The use of nonglossy paper is particularly welcome. The book can be heartily recommended for reading by all physicians having to do with patients over 50, but it cannot be considered as a book of reference.

Diabetes Mellitus By Zoltan T. Wirtschafter M.D., Clinician in Charge Clinic for Diabetes, Department of Medicine, Mount Sinai Hospital, Cleveland and Morton Korenberg M.D., Medical Resident, Jewish General Hospital, Montreal. Cloth. Price \$2.50. Pp. 186, with 9 illustrations. Baltimore: William Wood & Company, 1942.

"Diabetes Mellitus" by Wirtschafter and Korenberg is a poor book. Of the one hundred and fifty-nine pages of text thirty-one are direct quotations. Much of the remainder of the matter is made of abstracts, which often are not relevant to the subject discussed. Furthermore, critical review of these abstracts is not given. In the consideration of the treatment of coma, pages 158 and 159, at least one fourth of the one and one-half pages is made of a quotation from Claude Bernard. What did he know about diabetic coma? Furthermore, the amount of insulin recommended is ridiculous and insulin is given a second place in treatment and along with it are included vitamins.

Frederick M. Allen played a vital role in the knowledge of diabetes in this country, yet his name is not mentioned in the book, whereas Newburgh, who a few years ago adopted Allen's ideas and claimed that, by reduction of weight, dextrose tolerance tests could be brought to normal, is given an extensive discussion. Bouchardat is not mentioned. In reference 31, *H. Marble is a surgeon in Boston but he is not at all interested in diabetes*. Alexander Marble is the name.

The seventh edition of Joslin's book came out in 1940 and this book comes out in 1942, and yet the reference to Joslin is to the sixth edition, appearing in 1937. On page 130 it is said that "the prognosis of the diabetic individual is excellent." As a matter of fact, do insurance companies take persons who have diabetes? Does the Civil Service take them? Are there any statistics in the world published on diabetes in which their average duration of life reaches thirteen years? Is it not true that even the expectancy of life for a diabetic person for practically all ages is limited to two-thirds that of ordinary individuals?

The paragraph on insulin gives nothing of its practical use in treating the patient.

On page 140 it is said that "the total energy requirement of a sedentary individual weighing 70 kilograms has been found to be from 2,500 to 2,800 calories per day, while that of a moderately active person of the same weight is from 3,000 to 3,500 calories." If one should calculate the diet for a sedentary individual, it would contain approximately carbohydrate 240 Gm, protein 145 Gm and fat 123 Gm, calories 2,647, utilizing the authors' data, and for a moderately active person the authors advocate 40 per cent more, which would amount to approximately carbohydrate 300 Gm, protein 150 Gm and fat 150 Gm, calories 3,150, and if, as he says, 15 Gm of protein per kilogram and fat not over 100 Gm for a diabetic person weighing 70 Kg, this would amount to carbohydrate 482 Gm (1), protein 105 Gm and fat 100 Gm. This is certainly ridiculous.

One of the noteworthy pieces of work in the last two years is that of Stadie. One reference and one sentence are used to describe this.

The book has some good points, but these obvious faults make recommendation impossible.

Psychiatrische Untersuchungen an einer Serie von Zwillingen Von Erik Essen-Møller. Acta psychiatrica et neurologica, Supplementum XXIII. Paper. Pp. 200 with 82 illustrations. Copenhagen: Ejnar Munksgaard, 1941.

Genetic investigations, particularly research on twin development, have been thought to offer a clue for the detection of hereditary and environmental factors causing mental defects in twins. Recent studies on this subject have been made by a number of psychiatrists. Lovenberger began these investigations in 1928, and they have been continued by Lange, Kranz, Stumpff and Borgstrom on criminal twins, by Conrad on epileptic twins and by Smith and Juda on idiot twins. A recent study on epileptic twins and on the various psychotic types has been made by Rosanoff and his co-workers. Erik Essen-Møller in his monograph on psychiatric studies on a series of twins sets out to determine the possible association between certain external diseases and symptoms and innate, hereditary factors by studying almost exclusively a series of identical twins. However, a group of fraternal twins was investigated to provide a control for comparison with the identical twins. After citing a considerable number of cases of mental defects in twins, the

author is most impressed with the fact that the type of mental disease among twins is not always the same in a single pair. In a reported case one twin showed epileptic insanity while the other had a personality defect, thus the author found in identical twins that one sometimes manifested a psychosis and the other did not. Frequently both twins had personality defects though there were often differences between the defects shown by the same pair. The author is led to conclude that psychosis in twins develops on the basis of an abnormal hereditary constitution. Not all writers on this subject are agreed that hereditary factors are the prime cause of mental diseases of twins. For instance, Rosanoff and his co-workers believe that cerebral trauma at birth is a factor of highest importance and other investigators that environmental factors, such as social or economic privations, rank high as etiologic factors. In all the studies that have been published up to now on criminality, insanity, epilepsy and idiocy in twins there remains a divergence of opinion as to the causal factor. The difficulty of drawing conclusions as to the cause of mental disease in one or both twins from a psychiatric study of the patients is obvious. The author's interpretation seems reasonable.

Sternal Puncture: A Method of Clinical and Cytological Investigation By A. Piney, M.D. M.R.C.P., Physician, St. Mary's Hospital for Women and Children, London. With a foreword by the Rt. Hon. Lord Horder M.D., F.R.C.P. Cloth. Price, 12s. 6d. Pp. 77, with 2 illustrations. London: William Heinemann Ltd., 1941.

Study of the bone marrow is a highly specialized field which is unlikely to be undertaken by any one who is not already acquainted with hematology. This point of view may justify the inclusion of only two illustrations for the author, but it is doubtful whether the average reader will share it. The descriptive material is, however, authoritative and concisely stated and should prove useful in giving the reader a basic understanding of the subject. The technique of sternal puncture is precisely stated in the appendix, and the method preferred by the author is that used by Caronia and Arinkin. The author states the more important and practical facts of sternal marrow findings in leukemias, anemias, leukemoid reactions, tumors of the bone marrow, erythremia and allied states, and infective and protozoal diseases. A brief discussion of the normal sternal marrow findings in infants and children and some of the findings incident to blood dyscrasias of that age period would have materially contributed to the value of the monograph. Likewise the mention of methods available for the study of concentrated marrow would have been desirable. This practical monograph will serve a useful purpose and will be well received by the practitioner and technicians. They will miss the well executed colored plates of cells that they have come to expect of the author from his previous works on hematology. A few more colored plates to illustrate the descriptive material would have been of distinct value and increased the popularity of this monograph.

Acidos aminoácidos. Fisiología, patología, terapéutica. Por Pedro M. Re. Cloth. Pp. 1065 with illustrations. Buenos Aires: Librería y Editorial El Ateneo, 1940.

This volume is a monumental, comprehensive study of the amino acids and their pathologic, pharmacologic and physiologic effects, from the pen of one who has been consistently interested in the field of amino acids for the past thirty years. His early work, done in Rome and Paris, led to a career as a member of the Faculty of Medicine at the University of Buenos Aires. Significantly, a large portion of the text is devoted to a critical presentation of the extensive research carried out by the author, much of which has appeared in scientific literature in Argentina.

Introductory chapters treat of the discovery, properties, chemical composition and origin of the amino acids. Then follows, in order, a thorough enlightened discussion of the amino acids and acid-base equilibrium, the classification and chemical composition of proteins, the occurrence, action and chemical structure of enzymes, the biologic importance of the amino acids, amino acids of organs and tissues, the exogenous origin of the amino acids, the metabolism of the amino acids, detoxification processes, the importance of amino acids to nitrogen equilibrium and growth, amino acids which contain sulfur, pigments, porphyrins, alterations in pigment metabolism, biologically important amines, amino acids, and immunity.

Four chapters are devoted to a detailed experimental study of the variations occurring in the amount and composition of

amino acids in the blood of normal and diseased subjects. One chapter concerns the therapeutic use of amino acids, including the action of aminoacetic acid as a diuretic, glutamic acid as a salt substitute, the use of amino acids in urticaria, anaphylactic phenomena, hay fever, anemia, gastroduodenal ulcers, ulcerative colitis, hyperthyroidism, metabolic disorders, diseases of the heart, general infections, beriberi, pellagra, cancer, tuberculosis, muscular disorders, acidosis, diabetic acidosis and Addison's disease. The final chapter includes methods, technics and suggestions for the qualitative and quantitative analysis of amino acids. An extensive bibliography is appended.

The volume provides one of the most complete, authoritative treatises on the chemistry and biology of the amino acids that have been published to date. As a reference book it should be a valuable addition to any scientific library.

Simplified Nursing. By Florence Dakin, R.N., and Ella M. Thompson, R.N., B.S., Assistant Director Practical Nurse Training, Ballard School, Young Women's Christian Association of the City of New York. Fourth edition. Cloth. Price, \$2. Pp. 444, with 70 illustrations. Philadelphia, Montreal & London: J. B. Lippincott Company, 1941.

National emergencies create a need for reorganization of endeavor in many fields. In time of war the mother must assume many duties which might at other times be delegated to the professional nurse. But even in peace time the mother may find added to her problems that of care for some member of the family who is ill. This book merits its popularity. It is clearly written, and details of the technical procedure are so ably presented that the mother should find it easy to carry out the nursing care necessary for the comfort and well-being of the patient. The first section of the book deals with the trained practical nurse and the high school and vocational school nursing classes. The second section presents general information concerning the human body, public health, the health of the nurse, the preparation and use of food and housekeeping. The third and fourth sections deal particularly with nursing procedure in specific ailments.

Rheumatic Fever in New Haven. Edited by John R. Paul, M.D., Professor of Preventive Medicine, Yale University School of Medicine, New Haven. Paper. Price \$1. Pp. 176, with 45 illustrations. New York: Milbank Memorial Fund, 1941.

The authors have undertaken to give the local epidemiologic picture of rheumatic fever as the clinician sees it in the industrial city of New Haven. From a survey of hospital admissions, from mortality statistics for juvenile heart disease and from determinations of the incidence of rheumatic heart disease among school children they concluded that rheumatic fever is common in New Haven. They found that rheumatic fever often followed acute hemolytic streptococcus infections and that the seasonal distribution was similar, both diseases being most frequent in the winter and early spring. Nationality seemed to be unimportant except that there appeared to be an unusual susceptibility to rheumatic fever among people of Irish stock. Their studies indicated that parental rheumatic fever was associated with an increased incidence of the disease in the siblings. Rheumatic fever was found to be more frequent among the poor than among the well to do. Dampness of dwellings was thought to be important in accounting for the relatively greater number of cases among the poor. The careful survey which the authors have made is a distinct contribution to our knowledge of a difficult subject which needs further elucidation.

The Art and Science of Nutrition: A Textbook on the Theory and Application of Nutrition. By Estelle E. Hawley, Ph.D., and Grace Carden, B.S. Cloth. Price, \$3.50. Pp. 619, with 140 illustrations. St. Louis: C. V. Mosby Company, 1941.

Although this book has been prepared primarily for nurses, it is authoritative and should be useful to many other persons who desire a brief exposition of modern views on nutrition, food requirements under special conditions, diet therapy and the principles of selecting, preparing and serving foods. The illustrations are numerous and well chosen. There are a number of valuable tables in the appendix. Especially useful are the approximately fifty pages which are devoted to the chemical composition of foods.

Über cerebrale Zirkulationsstörungen: Tierexperimentelle Untersuchungen über Mikroembolien, Schädigungen der Gefässpermeabilität und Blutungen verschiedener Art. Von Tore Broman, Assistent am Physiologischen Institut in Lund. Acta pathologica et microbiologica Scandinavica, Supplementum XLII. Paper. Pp. 98, with 10 illustrations. Lund: Håkan Ohlssons Boktryckeri; Copenhagen: Ejnar Munksgaard, 1940.

This is an experimental study on guinea pigs, cats and rabbits of the effects of small emboli which stop the capillaries or the small terminal arterioles of the brain. The lesions were produced by intravenous injections of suspensions of rice or potato starch, emulsions of olive oil or air. At varying intervals after the embolism trypan blue was injected to make the permeability of the vessels visible. Any microembolic lesion was found to alter the vascular permeability after even as short a time as ten minutes. The author suggests that the altered permeability in the case of very small emboli may be due to absence of the normal contact between the vascular wall and the blood plasma. In the case of larger emboli the lesion occurs just on the proximal side of the embolus, and the author suggests that the lesion depends on defective nutrition of the vessel wall caused by stagnation of the blood stream. The lesion from the larger emboli persisted during some five days, and during that time an increase in the blood pressure due to epinephrine caused small hemorrhages from the damaged vessels, usually by diuresis but sometimes from rupture. These experiments support the view that massive hemorrhages in man result from ruptures and small hemorrhages from diapedesis. When blood plasma previously had passed out into the perivascular tissues the hemorrhages were annular. The experiments are clearly presented and illustrated by small but adequate colored photomicrographs.

Synopsis of Allergy. By Harry L. Alexander, A.B., M.D., Professor of Clinical Medicine, Washington University School of Medicine, St. Louis. Fabrikoid. Price, \$3. Pp. 246, with 22 illustrations. St. Louis: C. V. Mosby Company, 1941.

This is an excellent, brief but fairly complete book on allergy. It should be of value to the general practitioner or internist whose interest is primarily in the practical application of the subject. In a limited space the author has covered every aspect of clinical allergy: asthma, hay fever, gastrointestinal allergy, headache, allergic dermatoses, physical allergy, drug allergy, bacterial allergy. Each of these subjects is briefly but thoroughly discussed. Controversial matter is excluded by giving the most generally accepted opinion wherever possible. When disagreement exists, the author's interpretation is given. Emphasis on methods of therapy and practical therapeutic advice is present throughout. Unlike most brief books on allergy, the space allotted to each subject is proportionate to its importance. The illustrations are necessarily few. Two of these ("atopic dermatitis" and "positive skin reactions") are not sufficiently clear. The appendix at the end of the book consists of thirty-eight pages filled with well organized, practical technical information on a variety of subjects, such as preparation of atopens, a list of household materials and the allergens they may contain, diagnostic methods and recipes for special diets.

Applied Neuroanatomy. Part I: The Spinal Cord. By Rafael Hernandez, B.S., M.D., Professor of Neurology, Meharry Medical College, Nashville. Paper. Price, \$3.50. Pp. 123, with 95 illustrations. Ann Arbor: Edwards Brothers, Inc., 1941.

This book is based on lectures Hernandez delivered to his students throughout ten years as a teacher of neuroanatomy and clinical neurology. Only the most important facts, as the majority accept them today, are presented. The style is simple and direct, and the relation of neuroanatomy to neurophysiology and to diagnosis is stressed. The author makes no claim for originality and emphasizes that the material has been derived from the perusal of textbooks and original papers. The book has good diagrammatic drawings and should be useful for students and to practitioners who wish to refresh their minds on the essentials of neurology as it may affect their practice. The book is divided into two parts, one dealing with the spinal cord and the associated peripheral nervous system and the other dealing with the brain and the related peripheral nervous system. In each chapter the author gives a good bibliography of the subject.

Queries and Minor Notes

THE ANSWERS HERE PUBLISHED HAVE BEEN PREPARED BY COMPETENT AUTHORITIES. THEY DO NOT, HOWEVER, REPRESENT THE OPINIONS OF ANY OFFICIAL BODIES UNLESS SPECIFICALLY STATED IN THE REPLY. ANONYMOUS COMMUNICATIONS AND QUERIES ON POSTAL CARDS WILL NOT BE NOTICED. EVERY LETTER MUST CONTAIN THE WRITER'S NAME AND ADDRESS, BUT THESE WILL BE OMITTED ON REQUEST.

DEFENSE CHEMICALS AGAINST POISON GAS

To the Editor:—Is there available in either book or pamphlet form information relative to defense chemicals against poison gas in warfare? If so, where can this be secured? If it is not available will you advise how to make proper gas masks, especially the chemicals or substances used in the neutralizing or filtering cartridges of these masks? I shall appreciate any other pertinent information available relative to gas defense.

M.D., Pennsylvania.

ANSWER.—A booklet entitled *Protection Against Gas*, recently issued by the United States Office of Civilian Defense, Washington, D. C., will probably supply all the information desired. The *Medical Aspects of Chemical Warfare*, by E. B. Vedder (Baltimore, Williams & Wilkins Company, 1925), or *Chemicals in War*, by A. M. Prentiss (New York, McGraw-Hill Book Company, 1937), may also be consulted. The mainstay of defense against poison gas is activated charcoal. This substance alone is generally regarded as affording adequate protection against any toxic agents likely to be used against civilian populations. Under certain conditions—the practice varying from country to country—charcoal is supplemented by an admixture of soda lime, by filters designed to remove toxic smokes or by a variety of agents introduced for specific purposes.

LIFE EXPECTANCY FOR ADULT WITH RHEUMATIC HEART DISEASE

To the Editor:—Could you tell me the known expectancy of life in a man of 30 who has post-rheumatic mitral regurgitation and mitral stenosis (duration unknown)? May marriage be advised for such a person?

M.D., New York.

ANSWER.—There is one essential fact that one must know in a case of rheumatic heart disease with mitral valve involvement such as that presented, and that is the degree of the involvement. If the condition is slight and the person has ordinary luck and lives with a reasonable amount of common sense, he not only can marry, raise a family and carry on his life work but can survive the full life expectancy or even longer. Some cases have recently been reported in which patients with definite rheumatic mitral stenosis lived to be over 80. If, however, the defect is considerable, the strain on the circulation and the possibility of serious complications are such that a long life cannot be prophesied; in fact, it is likely that with a high degree of mitral stenosis at 30 the man would be lucky to reach the age of 45 or 50. In other words, there is a wide range of possible longevity in the presence of mitral stenosis, dependent in the main on the amount of actual heart disease present. Furthermore, the more severe the mitral lesion the worse will be the effect of a recurrent rheumatic infection, which is always a possibility, even in middle age or later.

PROBABLE ATOPIC DERMATITIS

To the Editor:—A woman aged 31 has had an allergic dermatitis of the face and neck for the past nine months. More than one hundred skin tests have been made, with no positive reaction. She has been under the care of several dermatologists and has received physical therapy, local applications to relieve itching and burning and internal medication (sedatives, histaminase and ephedrine). There are no abnormalities of the general physical makeup; the blood Wassermann reaction is negative; there is a normal blood sugar and urea content. She has been using a low starch diet. Despite all efforts, diagnostic and therapeutic, the cutaneous reactions continue. To ask advice and receive an opinion as to what more can be done in her behalf is the purpose of this query.

M.D., Pennsylvania.

ANSWER.—The information given in the query permits only a general answer. The diagnosis of an "allergic dermatitis" of the face and neck, of only nine months' duration, is not sufficiently specific. No statement is made as to whether the lesion is of the contact (vesicular) type, the type characteristic of atopic dermatitis or the urticarial type. There is some justification in assuming, on the basis of the limited information given, that if the condition is on an allergic basis it belongs to the group of contact dermatoses. It is not stated in the query what substances were used in the skin tests or whether these were cutaneous, intracutaneous or patch tests. If the diagnosis of contact dermatitis is to be accepted, contact (patch) tests

should be used. The materials to be tested should be selected on the basis of the history and the appearance of the lesions, including especially the distribution. Thus, with lesions limited to the face and neck in a woman aged 31, substances that come in contact with the face, neck, scalp and hands should be suspected first. These substances comprise cosmetics of all sorts, including preparations used on the finger nails, perfumes, preparations used on the scalp and hair, hand lotions, soaps, dyes and lacquers. In addition, one should not overlook substances with which the patient may come in contact occupationally, either in house work or in other occupations.

The skin of the hands, because of its greater resistance, may have no lesions and yet be responsible for bringing the offending material in contact with the much more delicate skin of the face and neck. The same explanation holds for substances used on the scalp. A more detailed discussion of this type of dermatitis is given in *Dermatologic Allergy*, by Marion B. Sulzberger (Springfield, Ill., Charles C. Thomas, 1940, pp. 87-126). The fact that the patient has been under the care of dermatologists would indicate that adequate local care has been given for the relief of symptoms. The measures used for local treatment vary greatly, of course, with the type of lesion prevailing from time to time. If the condition, however, is on an allergic basis, in which the patient is constantly adding insult to injury, local care in itself, while important, will not be sufficient to produce satisfactory results.

MICROANALYTIC BLOOD CHEMISTRY

To the Editor:—In the practice of pediatrics it seems highly desirable to have blood chemistry determinations performed by micromethods as far as possible. I wish to set up a laboratory in connection with a children's clinic and would appreciate information and references on the subject. What is the amount of blood necessary? Is venous or capillary blood used? What is the relative reliability of the micromethod as compared to standard methods in which larger amounts of blood are used? What special apparatus, in addition to laboratory equipment used in older methods, is necessary for the micromethods?

M.D., New York.

ANSWER.—Microanalytic methods are available for the determination in blood of the content of total nitrogen, nonprotein nitrogen, urea, uric acid, sugar, chlorides, calcium, magnesium and phosphate and of the carbon dioxide combining power. There is also a micromethod for determining the prothrombin time which, although not in the same category with the tests mentioned, may be found useful in a pediatric clinic. Venous or capillary blood may be used, varying in amount in the different determinations from 0.1 to 0.5 cc. When 0.1 or 0.2 cc. of plasma is required, as in the determination of the calcium, magnesium and phosphorus content and the carbon dioxide combining power, it is necessary to collect at least 0.5 cc. of whole blood. This amount can be obtained by routine finger, toe or heel puncture if collected in a small tube. Direct collection by pipet is more difficult because of the chance inclusion of air bubbles.

The reliability of these methods compares favorably with that of the standard macroprocedures if the technician performing the tests has been trained for highly accurate work requiring careful attention to detail. With poor or indifferent performance the result of any error in technique will be increased approximately in proportion to the reduction in the size of the sample analyzed.

If the clinic laboratory is completely outfitted for general blood chemical work little additional special apparatus is required. Special micropipets graduated at 0.1 and at 0.2 cc. are necessary for the collection and transfer of blood or plasma. Short centrifuge tubes and interchangeable cups connected by a ground joint are needed for the collection of blood under oil in the determination of the carbon dioxide combining power. In the determination of phosphates a 12 by 120 mm. test tube graduated at 1 and 2 cc. is recommended for the precipitation of protein. The Kuttner and Cohen procedure for calcium requires a platinum dish for ashing of the sample. The Hirschfelder and Serles method for calcium and magnesium recommends the use of a special 7 by 70 mm. centrifuge tube, tapered at the same angle as the ordinary 15 cm. tube. Kato's method for prothrombin requires a special microhemipipet capable of measuring 30 to 40 cubic millimeters of blood.

References:

- Archer, H. E., and Robb, G. D.: *Quart. J. Med.* 18: 274 (April) 1925 (urea).
- Exton, W. G.; Schattner, F., and Rose, A. R.: *Am. J. Clin. Path.* 11: 632 (Aug.) 1941 (CO₂ combining power).
- Folin, Otto: *New England J. Med.* 206: 727 (April 7) 1932 (sugar).
- Folin, Otto, and Svedberg, A.: *J. Biol. Chem.* 88: 85 (Aug.) 1930 (nonprotein nitrogen, urea, uric acid, sugar).
- Hirschfelder, A. D., and Serles, E. R.: *J. Biol. Chem.* 104: 635 (March) 1934 (calcium, magnesium).
- Kato, Katsuj: *Am. J. Dis. Child.* 59: 310 (Feb.) 1940 (prothrombin).
- Kuttner, T. T., and Cohen, H. R.: *J. Biol. Chem.* 75: 517 (Nov.) 1927 (phosphate, calcium).
- Rusznayk: *Biochem. Ztschr.* 114: 23, 1921 (chlorides).

TREATMENT OF ACID BURNS

To the Editor:—What is the best neutralizing agent to use in the treatment of severe acid burns after washing with plenty of water? What is the best treatment after neutralization? M.D., Pennsylvania.

ANSWER.—This reply deals solely with the matter of neutralization of acid burns and not with the total treatment of such burns, since adequate discussion of severe burns would far exceed the space allotment of this department. For whatever reference may be made to neutralization ready acceptance may not be expected, since throughout the profession there is wide divergence of opinion. It appears to be established that as low a temperature as 113 F. may lead to coagulation of muscle and some injury to other tissues. Therefore the heat of chemical reaction from neutralizing agents more often than not may add injury to that already produced by the acid. On this account there are good reasons for advocating the use of a maximum amount of water over considerable periods of time to render acids inert rather than relying on any neutralizing agent. Through the use of water or saline solution the heat of chemical reaction is avoided or at least dissipated. Davidson (*Ann. Surg.* 85:481 [April] 1927) has concluded that "the results obtained in the treatment of experimentally produced alkali and acid burns were decidedly better when the caustic agent was removed by dilution with water than when rendered inert by neutralization." In the case of chromic acid burns the situation may be different. Somewhat peculiarly, chromic acid is not hydrolyzed within tissues and its action may persist for many days, leading to undermined ulceration. After initial lavage, some advantage may result from the use of wet dressings of 5 per cent ammonium polysulfide for some such period as three days, followed by wet dressings of 5 to 10 per cent sodium citrate, sodium lactate or potassium and sodium tartrate for the purpose of stripping the chromium from the tissues. Depending on the severity of the chromium burn, such a wet dressing may be continued for another period of three to five days. In the case of acid burns of the eye, in addition to copious lavage there may be justification for the use of mild neutralizing agents such as 3 per cent sodium bicarbonate, although such applications may be painful and require local anesthesia. To revert to acid burns in general, along with the measures for the elimination of acid there may be requirements for the prevention and control of shock, but after elimination of the acid proper treatment is as for other forms of burns through many ramifications.

POSSIBLE DEATH FROM "ETHER CONVULSIONS"

To the Editor:—A girl aged 5 years was taken ill about a month ago with pain in the abdomen and vomiting. Her temperature was normal, her abdomen was soft, and no localized area of tenderness was found. There were no signs of any respiratory infection. The next day I saw her three times. She had fever ranging from 100.4 to 101 F. in the evening. There was no more vomiting, and the bowels moved with an enema. Her complaints of abdominal pain were vague and varied from one examination to another. In the evening I found her sleeping on her stomach; she seemed to be without distress. The urine was normal at this time. Neither laxatives nor food were allowed except small amounts of fluids. An ice bag was kept on the abdomen. Two days later in the morning the child seemed acutely ill, with some abdominal rigidity in the right lower quadrant. The diagnosis of appendicitis was confirmed and the child was taken to the hospital at 4 p.m. The temperature then was 104 F. Five per cent dextrose was given immediately and she was taken to the operating room. The white blood count was 23,000. The operation was performed under ether anesthesia following induction with nitrous oxide and oxygen. A gangrenous, non-perforated appendix was found. Early during the operation the child had convulsions of a curious type; flexion of the forearms with pronation and adduction of the hands. Similar movements were observed in the lower extremities. The pulse rate was rapid, 150 a minute or more. The temperature seemed to rise; the pupils seemed to dilate and constrict alternately. Toward the end of the operation these convulsive movements increased in frequency. Breathing became shallow and laborious. Atelectasis of the right lung (middle and lower lobes) was found on percussion. Bronchoscopy was performed as soon as possible, but the breathing did not improve despite this and oxygen administration. The child stopped breathing during the bronchoscopy. Necropsy was not performed. Could you suggest what caused the child's death? She was normal as far as the heart and lungs were concerned.

M.D., Maryland.

ANSWER.—She may have had a cerebral vascular accident or she may have simultaneously had encephalitis. Possibly she died of convulsions under ether anesthesia. This subject was reviewed by Frank J. Jirka and Frank C. Hofrichter in the *Illinois Medical Journal* 75:549 (June) 1939. Most of the reported cases have occurred in children, many of whom have had a gangrenous appendicitis. Ether has been the anesthetic usually employed when this condition has occurred and the term "ether convulsions" has arisen for this syndrome. There is no specific treatment for the condition.

SPERMATOGENESIS AND FERTILITY

To the Editor:—An x-ray technician aged 27 was found by semen examination to have only occasional motile spermatozoa in each specimen. In spite of three years of attempts, his wife has failed to become pregnant. His past history includes several significant points: As a schoolboy, although masculine, he preferred the company of girls. He is the only son in the family, which includes four sisters. At the age of 9 he had a bilateral herniorrhaphy. For the past four years he has done x-ray work, observing the common precautions of avoidance of exposure most of the time. He believes that his ejaculations are early and that during the first week of his marriage they were often premature. There is no venereal history. Masturbation before marriage was about twice a month. The man is well built and well nourished and is masculine in appearance except that there is less hair than ordinary on the chest and under the arms. The hair is long and dark. The voice is bass. The semen specimen was 15 cc. of cloudy whitish fluid. What would be the recommended procedure? M.D., Ohio.

ANSWER.—The fact that motile spermatozoa were found in the semen shows that the tubes are not obstructed. The bilateral herniorrhaphy has therefore nothing to do with the present sterility. The case is evidently endocrine in nature, a lessening of the spermatogenic function of the testes. It may well be that the continuous exposure to the x-rays may account for this, as it has been shown that this may take place in spite of protection (Huhner, Max: *The Diagnosis and Treatment of Sexual Disorders in the Male and Female Including Sterility and Impotence*, Philadelphia, F. A. Davis Company, 1941, p. 6). While endocrine therapy may be indicated in this patient, there is, unfortunately, no type of therapy which has proved reliable in the induction of spermatogenesis. Various gonadotropic substances have been used without success. Semen specimens should be obtained in a jar and not in a condom, and no heat should be applied to the specimen. If the ejaculations are premature or rapid, a Huhner test should be made to see whether the spermatozoa actually reach the cervix.

CYANIDE DERMATITIS

To the Editor:—What is the best method of treatment of dermatitis venenata due to contact with solutions containing sodium and potassium cyanide? This is an occupational hazard with workers who are doing gold plating work, and it is important to keep these men at that particular job if possible, as they are experienced. What is the accepted local treatment for exposed parts of the body, such as the hands, which are commonly in contact with the offending solutions?

Allan Klein, M.D., North Bergen, N. J.

ANSWER.—The best treatment for cyanide dermatitis is to avoid all contact of the skin with irritant cyanide solutions, particularly further contact after the appearance of any dermatitis. When cyanides are present on skin surfaces the cyanide is transformed promptly to the carbonate, so that the lesion produced foremostly is an alkali burn. Some physicians are apprehensive that enough cyanide may be absorbed to induce systemic cyanide poisoning. While this may be doubted, there is every reason for the prompt removal of any such solution in order to avoid the action of alkali. The best treatment probably is the use of boric acid ointment U. S. P. or wet boric acid dressings. Boric acid admirably serves as a buffering agent and if persistently used will maintain a pH in a range from 0.6 to 0.8. The same buffering action may be secured through the use of citric acid or citrates, but a preference is expressed for boric acid. When deep ulcerations are produced by cyanide or, more likely, by the carbonate, with ensuing eschars, superficial débridement may be indicated.

METALLIC TASTE IN MOUTH

To the Editor:—Kindly give me any information you have regarding the cause of a metallic taste in a patient's mouth and specifically whether a vitallium bridge could produce it. J. J. Szama, M.D., Bloomer, Wis.

ANSWER.—A metallic taste is a relatively common incident among adults, though not ordinarily discussed in textbooks or medical literature. An intermittent or constant metallic taste in the mouth may be caused either by the ingestion of any of the soluble metals or by the local application to the nose, mouth or adjacent structures of solutions containing such metals, though rarely do such metallic tastes occur except in the presence of metallic restorations in the mouth which are electro-potentially different from the metals taken. It has been proved and further verified by many physicians and dentists that metallic dental restoration such as dentures, fillings, bridges and inlays, of dissimilar character and occupying different positions in the standard electromotor series of metals, may cause an intermittent metallic taste as a result of the chemical ionization or an interchange of metallic electrons through the saliva which serves as the electrolyte. Even neutral saliva is sufficient to

cause some electrogalvanism, but strongly alkaline or acid saliva intensifies the reaction.

These studies may be reviewed from the following bibliography:

- Lain, E. S.: *Electrogalvanic Lesions of Oral Cavity Produced by Metallic Dentures*, *THE JOURNAL*, March 11, 1933, p. 717.
Lain, E. S.; Schriever, William, and Caughron, G. Sherrill: *J. Am. Dental A.* 27:1765 (Nov.) 1940.
Lippman, A.: *Disorders Caused by Electric Discharges in Mouth in Metallic Dentures*, *Deutsche med. Wchschr.* 56:1394 (Aug. 15) 1930.
Solomon, H. A.; Reinhard, M. C., and Goltz, H. L.: *Salivary Influence on Galvanism*, *D. Items Int.* 60:1047 (Nov.) 1938.
Dreher, G. C.: *That Metallic Taste*, *Dental Survey*, November 1937.
Hodgen-Shell: *Dental Materials*, St. Louis, C. V. Mosby Company, 1938, p. 228.
Mead, S. V.: *Diseases of the Mouth*, St. Louis, C. V. Mosby Company, 1940, p. 655.

Experiments with the metal known as vitallium discloses that there is only an inappreciable amount of electrogalvanism which takes place between this and the so-called noble metals. However, all metals as used in dental restoration must be alloyed with two to five others. Therefore it is possible that even a vitallium bridge in the mouth which contains other restorations, or after a metallic drug has been taken, might be an occasional source of a metallic taste.

LOSS OF BODY FAT IN DEPANCREATIZED DOG

To the Editor:—In *The Journal*, Sept. 6, 1941, page 852, there is published under *Glandular Physiology and Therapy* the article "The Pancreas as an Organ of Internal Secretion," by Waters and Best. Will you please answer the following question? On page 854, third paragraph, this statement is made: "The ketosis in a depancreatized fat dog is greater than in a lean one, but this species is characterized by its efficiency in metabolizing fats without ketosis. The loss of body fat is rapid, but the ketosis may be so severe . . ." What causes this rapid loss in body fat in the depancreatized dog?

Richard P. Shapiro, M.D., Philadelphia.

ANSWER.—In the diabetic state there is an increase in the metabolic rate, dextrose is not as available to the tissues as is normally the case and some is lost in the urine. This results in an increased demand for alternative sources of energy, namely proteins and fats. Thus withdrawal of fat from the so-called depots occurs, with a consequent increase in the oxidation of fat in the liver, with increase in acetone body production, and in the muscles. Little is known about the mechanism of this mobilization of depot fat. There is no good evidence that it is under nervous control. It is likely that hormonal control plays a part. Thus it is known that extracts of the anterior lobe of the pituitary lead to an increase in the mobilization of liver fat from the fat depots (Barrett, H. M.; Best, C. H., and Ridout, J. H.: *J. Physiol.* 93:367 [Sept. 16] 1938). To what extent this is a normal physiologic action of the anterior lobe of the pituitary gland can only be surmised.

HASTINGS' STAIN

To the Editor:—Can you supply an accepted procedure for preparation and use of Hastings' stain for blood films? I am experimenting with the use of the opsonic index in possible undulant fever, and I find that most "procedures seem to prefer this stain, yet I can find nothing on hand that gives the method. Theodore Baker, M.D., Niagara Falls, N. Y.

ANSWER.—Hastings' stain has never been standardized. It is a blood stain of the eosin-methylene blue type, similar to Wright stain, differing from the latter chiefly in the method of preparation. It was described by T. W. Hastings (*J. Exper. Med.* 7:265, 1905). The chief respect in which it differs from the stain described by Wright is that the polychrome methylene blue is neutralized with acetic acid and, when mixed with the eosin solution, a small amount of fresh methylene blue solution is mixed with it. Inquiry of the stain companies indicates that they regard Hastings' stain and Wright stain as identical. The procedure referred to in the inquiry was proposed by I. F. Huddleson; his publication definitely specifies Hastings' stain, purchased from the Hartman-Leddon Company of Philadelphia. A personal letter from Dr. Huddleson states that this is the only reliable source of this stain that he has found for the technic in question. A communication from this company states that whenever Hastings' stain is ordered for the Huddleson technic the company takes care to see that it is of the same type as that which Dr. Huddleson has been purchasing. Information is not available, however, to the Biological Stain Commission as to whether there is any essential difference between this stain and that which the same company regularly sells under the name of *Wright stain*.

MATCHING OINTMENT COLORS TO SKIN

To the Editor:—Please mention a dye and the amount to use for coloring a white ointment to be used on the face.

M.D., Roxbury, Mass.

ANSWER.—A colorless ointment base or perhaps a cold cream can be made to correspond to the color of the patient's skin by the cuticolar powder devised by Fantus and Dnyiewicz (*Cuticolar Preparations*, *J. Am. Pharm. A.* 27:878 [Oct.] 1938, which consists of a mixture of red and yellow ferric oxides with zinc oxide. This differs from calamine powder in containing the yellow oxide, which allows a better match to be made with the color of the skin. The proportions given in the article cited do not apply to all lots of these powders. Fantus and Dnyiewicz used 3 per cent of the red oxide and 4 per cent of the yellow powder. In another lot used elsewhere the proportion of yellow oxide had to be cut down to a fraction of 1 per cent to get the proper color. This has to be determined by experiment with each lot of powder. If a darker shade is needed, blood charcoal may be added to suit.

DELIVERY OF TRUNK AFTER HEAD DELIVERY

To the Editor:—In the second stage of an otherwise normal labor how long is it safe to leave the body of the fetus undelivered, having the head completely delivered with the respiratory passages cleared of mucus and no cord around the neck?

G. A. Prachar, M.D., Tecumseh, Neb.

ANSWER.—It is probably safe to leave the body of the fetus in the uterus for as long as ten minutes after the head has been delivered, provided the respiratory passages are cleared of mucus and there is no constriction about the neck. Difficulties in the delivery of the fetal trunk arise as a result of obstructions to the delivery of the shoulders. An excessively large baby, the shoulder girdle in the transverse plane of the pelvis or a tetanic contraction of the uterus about the fetal trunk as a result of a long and difficult delivery may seriously interfere with the delivery of the fetal body. In most instances intracranial damage and fetal death are the result of the trauma of the manipulations incidental to attempts at delivery or the interference with fetal circulation. Care in delivery rather than the time factor determines the likelihood of damage to the baby.

HUMIDITY AND COLDS

To the Editor:—What effect does the household humidity have on susceptibility to the common cold?

F. L. R. Roberts, M.D., Spirit Lake, Iowa.

ANSWER.—Although it is generally believed that excessive dryness may predispose to increased incidence of infections of the respiratory tract and to susceptibility to the common cold, actual evidence is difficult to obtain. The problem must be studied, therefore, more from the point of view of physiologic principles than from that of actual fact. Some of the foremost authorities on nasal function, notably Hilding and Proetz, have demonstrated the adverse effects of drying on ciliary action and on the effective functioning of the "mucous blanket" covering the nasal epithelium. Proetz, particularly, has suggested that excessive drying of the nasal mucosa may predispose to trauma from improper blowing of the nose, allowing the formation of denuded areas of ciliated nasal epithelium into which viruses or bacteria might enter. This interference with the normal functional state of the nasal mucosa by drying might thus increase susceptibility to acute rhinitis. It would seem indicated, therefore, to prevent this adverse drying action on the nasal epithelium if possible, and it should be possible to accomplish this by increasing the moisture content of the air.

USE OF CACODYLATES

To the Editor:—I should like some information on the values and indications for use of the various cacodylate compounds. M.D., California.

ANSWER.—Sodium cacodylate has been given a place in the U. S. Pharmacopoeia for many years. In *New and Nonofficial Remedies*, 1941, page 111, two pages are devoted to various dosage forms of sodium cacodylate. At one time sodium cacodylate had a wide vogue, being used particularly in such conditions as Hodgkin's disease, the leukemias and lymphosarcoma, and, of course, it was even once suggested that it be used for the treatment of syphilis. It is questionable today whether there is any real indication for further continuation of this preparation in the U. S. P. The Council on Pharmacy and Chemistry has recently voted to delete sodium cacodylate from N. N. R. It certainly is of no value in the diseases mentioned and there are no indications for its use.

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TREATMENT OF ARTHRITIC JOINTS

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BOSTON

ARTHRITIC JOINTS

One still hears too frequently the neglected cripple, on seeking hospital care, declare that her physician despairingly admitted to her or to members of her family that she had arthritis and that there was no treatment which would help her. It is to that physician in whatever community he may reside that this paper is written.

Some idea of the relative importance of rheumatism may be gained from the estimated prevalence of specified chronic disease in the United States in 1937,¹ shown in the accompanying table.

In Massachusetts alone, out of a population of about 4,250,000 in 1930, there were 140,000 persons² found afflicted with this "king of human misery." Today it represents our greatest single cause of chronic disease. Yet four fifths of the poor and one half of the well-to-do who were suffering from chronic disease were not under the care of any physician.

In most forms of arthritis the joint symptoms are only manifestations of a systemic disease. Therefore the care of the patient should not be relegated to one physician but to a group consisting of an able, interested internist who should work with the aid of the orthopedic surgeon, the physical therapist, the occupational therapist and, in many instances, the psychiatrist.

Deformities may be prevented by simple orthopedic management, which, to a certain extent, can be carried out by any physician who realizes the danger from neglect and who knows how to apply preventive measures. An ounce of early well directed care to prevent deformities and relieve pain until the disease process is quiescent is worth tons of reconstructive work later. It avails one little or nothing to arrest or cure the disease process and have deformed joints that doom the patient to the life of a cripple. Such a patient can never become self sufficient without a long program of joint rehabilitation and correction.

The care of the joints in arthritis regardless of the cause has been a neglected subject. A great deal has been written concerning the physiologic and pathologic

changes in articular structures, but only a few papers have appeared in recent years that give the physician any help in dealing with these complex structures. In the first place, accuracy in diagnosis is of paramount importance for both treatment and prognosis. The present acceptable working classification is based on the cause:

Origin known:

1. Traumatic; e. g., due to internal derangements of joints, fractures into joints, and so on.
2. Infectious; e. g., due to the tubercle bacillus, gonococcus, streptococcus, staphylococcus or other organism.
3. Neuropathic; e. g., due to tabes, syringomyelia, leprosy, or other disease.
4. Arthritis associated with metabolic or constitutional diseases; e. g., hemophilia, gout.
5. Anaphylactic or allergic; e. g., associated with serum sickness.
6. "Fibrositis," "fascitis," tenosynovitis, and so on, of known origin.

Origin not certainly known:

1. Rheumatoid, proliferative or atrophic arthritis.
2. Hypertrophic, degenerative or osteoarthritis.
3. Rheumatic fever.
4. "Fibrositis," "fascitis," tenosynovitis, and so on, of unknown origin.

Most deformities occur in the rheumatoid type for which there has been offered no satisfactory or acceptable etiology; consequently there is no specific means of therapeutic attack. Nevertheless, certain general principles have proved valuable in preventing deformities. Even in those groups in which the cause is known or suspected, the joints must be adequately cared for while the offending agent is being attacked by other means.

As a general rule, flexion deformities are the ones to be guarded against. The aims in the care of joints should be prevention of deformities and preservation of as nearly normal joint motion as possible.

Rest, unquestionably, is the sheet anchor in the orthopedic management of arthritic joints. Comfortable support to the affected part should be provided in a neutral position or in a position for optimum use should the joint eventually become limited in motion or ankylosed. Active or guided motion (without injury) must be employed daily in an effort to retain as much motion as possible; first, by preventing the formation of adhesions within the joint; second, by preventing contractures of periarticular structures, and, third, by providing a stimulus to the articular cartilages.

If a patient with painful joints due to arthritis is placed in bed and left there without proper care, the extremities eventually assume well recognized deformities. Extensive atrophy takes place in the muscles, bones and joint cartilages because little motion can be performed in painful limbs which are held rigid by con-

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1. Osgood, R. B.: The Medical and Social Approach to the Problem of Chronic Rheumatism, *Am. J. M. Sc.* 206:429 (Oct.) 1940.
2. Bigelow, G. H., and Lombard, H. L.: Chronic Rheumatism in Massachusetts, *New England J. Med.* 203:1232 (Dec. 18) 1930.

stant muscle spasm. Even in normal joints the cartilage becomes atrophic if the parts are immobilized for long periods of time.³

In this paper individual joints have been considered separately except in certain instances in which several

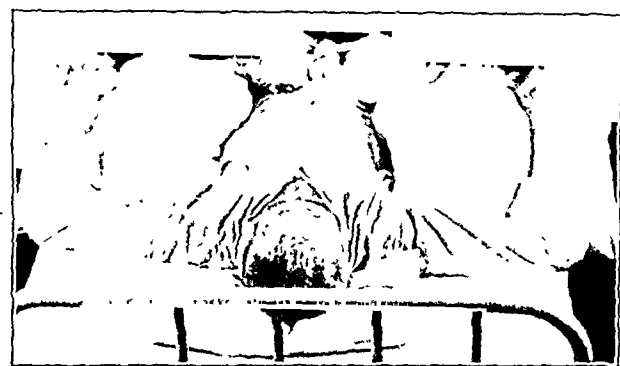


Fig. 1.—Shoulders supported with pillows in abduction and external rotation.

joints have been grouped together for obvious reasons. One objection to this form of presentation is that repetition of certain forms of treatment is bound to appear. Nevertheless, we feel that the advantages of this method outweigh its disadvantages.

Chronic Diseases in the United States in 1937

Diseases	No. of Cases
Rheumatism ..	6,850,000
Heart disease ..	3,750,000
Arteriosclerosis and high blood pressure ..	3,750,000
Nephritis and other kidney diseases.....	1,550,000
Nervous and mental diseases.....	1,450,000
Cancer and other tumors.....	930,000
Tuberculosis, all forms.....	680,000
Diabetes mellitus ..	660,000

SHOULDER

In attempting to avoid shoulder deformities, one should restrict the use of excessive pillows beneath the head, neck and back in reclining or semireclining posi-

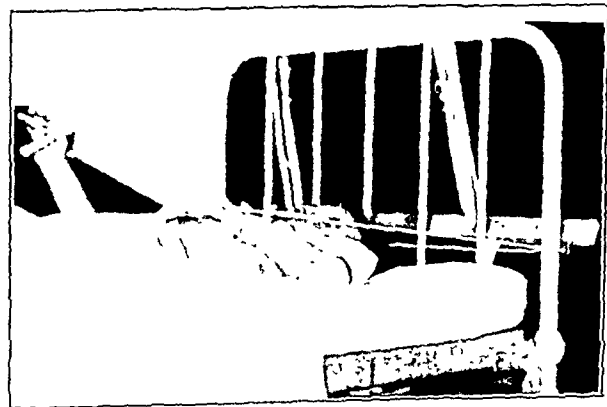


Fig. 2.—Shoulder pulleys placed at the head of the bed to preserve and increase motion.

tions. The bed should be as flat and firm as tolerated, and only a small pillow, if any, should be allowed beneath the head. The patient should be taught to lie with his hands clasped beneath his head for short periods sev-

eral times daily, since this position permits shoulder abduction and external rotation.

In arthritis of the shoulder there is frequently a tendency to forward drooping with adduction and internal rotation of the arm. This may be prevented by supporting the arms with pillows, sandbags or plaster splints in a moderate amount of abduction and external rotation (fig. 1). Codman⁴ has taught that adhesions form less readily in this position. If the shoulder is the only joint involved and the patient is otherwise ambulatory, an airplane splint may be used.

During the stage of acute activity, hot fomentations applied to the shoulders greatly relieve pain and muscle spasm and permit freer motion. It is important to remember that after the fomentations are applied the shoulder should be passively guided or actively moved



Fig. 3.—A molded plaster splint for resting the upper extremity.

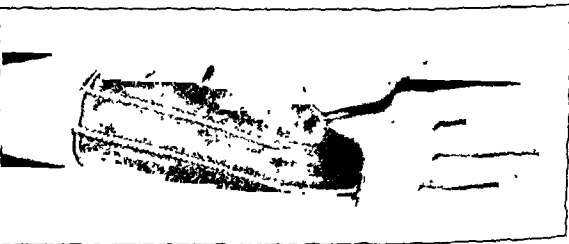


Fig. 4.—Removable leather cock-up splint for the wrist.

at least twice daily through as full a range of motion as is possible, to prevent adhesions. Shoulder pulleys (fig. 2) or screw eyes fastened to ends of a board, attached to the head of the bed, constitute a useful and simple device to assist active motion in the acute stages. Ordinary awning pulleys or screw eyes and awning rope may be obtained from the local 5 and 10 cent stores.

In the quiescent period, deformity and limitation of motion may be corrected by using the same device, by gradual stretching after heat and massage or by the aid of occupational therapy, such as the use of looms and other exercises designed to promote shoulder motion.⁵ If such conservative methods fail, manipulation under anesthesia, if gently performed, is a safe and effective method to secure an increased range of motion. The manipulated joint must be moved twice daily through its new range to prevent adhesions reforming.

3. Green, W. T., and Ober, F. R.: Chronic Arthritis in Children, Proc. Am. A. for the Study and Control of Rheumatic Disease, first annual meeting, third conference, Cleveland, 1934.

4. Codman, E. H.: Boston M. & S. J., 165:115 (July 27) 1911.

5. Joplin, R. J.: Application of Principles of Posture in Occupational Therapy, Occup. Therapy 20:1 (Feb.) 1941.

Actual ankylosis of the shoulder joint is rare but does occur. Restoration of motion requires surgical intervention.

ELBOW

One reason why the elbow joint is so frequently attacked in arthritis is probably that it is misused. Although it is normally a non-weight bearing joint, when the patient begins to support himself by holding on to chairs, tables or by using a cane the elbow becomes a partial weight bearing structure. Such misuse constitutes trauma. Especial vigilance is needed to prevent deformity or limitation of motion.

During the acute stage the patient carefully holds his elbow in the protective position of flexion. Should he be confined to bed, the elbow is usually held at an angle

hot fomentations followed by gentle manual stretching or by allowing the patient to carry weights. Traction often proves effective when other measures have failed. Manipulation under anesthesia is seldom satisfactory because increased stiffness frequently follows. If com-

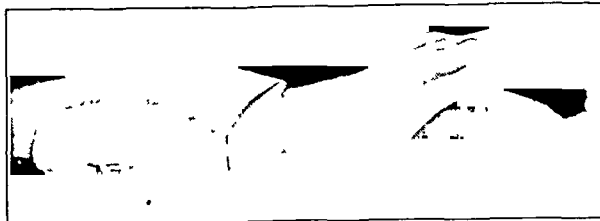


Fig. 7—Cock up plaster splint to correct ulnar deviation of the hand and fingers.

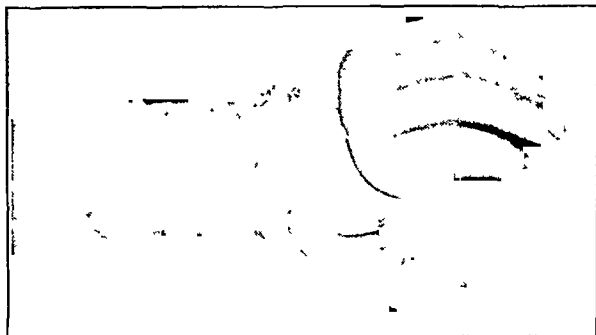


Fig. 5—Permanent cock up splint for wrist, made of castex

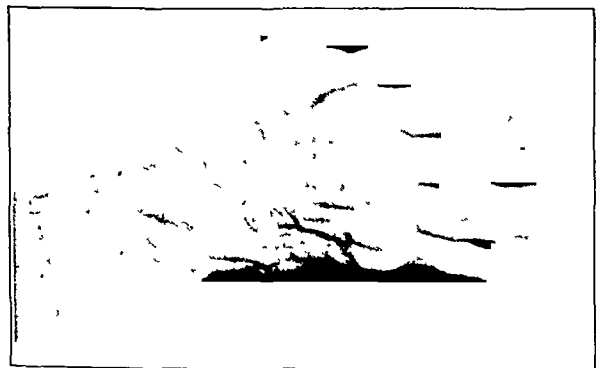


Fig. 6.—Arthritic deformity of hand showing characteristic ulnar deviation and subluxation of the fingers

of 90 degrees or less with the hand in pronation resting on the chest. This is the customary position these patients assume during sleep in order to assure themselves a little comfort.

Treatment during this stage (fig. 3) consists in resting the entire arm and hand in a molded plaster splint with the elbow in as much extension as can be tolerated. The arm should rest in this support most of the time but may be removed several times daily to allow guided or active motion. If ankylosis appears to be taking place in spite of adequate therapy, the joint should be allowed to fuse in a useful position, which is slightly less than a right angle with the forearm in supination or midway between supination and pronation.⁶

After the disease has become quiescent, some of the limitation of motion may be overcome by the use of

plete ankylosis has occurred in a bad position and motion is greatly desired an arthroplasty may be resorted to, provided the disease has become quiescent.⁷

WRIST

When the wrist is involved, deformity results from the overpowering pull of the flexor muscles, aided by gravity, in keeping the joint palmar flexed. This position tends to diminish the hand's normal grasping power. Furthermore, the position of comfort assumed by arthritic patients confined to bed, namely with the hands resting across the chest, leads not only to flexion of the wrist but to ulnar deviation of the hand as well. This deformity may be easily prevented by the use of cock-up splints made of various kinds of splinting material, such as plaster of paris, leather (fig. 4) or castex (fig. 5). The advantages of the castex wrist support are many, for it can be applied next to the skin without padding and left in place for weeks at a time. Since it is waterproof, it does not restrict one's ordinary functions. For example, a housewife can wash dishes with the splint on. Such a support worn constantly has proved more effective for this joint than one that is removable.

The "optimum angle" of the splint should be about 30 degrees in dorsiflexion. These splints should extend from the upper forearm down to the palmar crease to permit active use of the hand if the fingers are not involved. If the fingers are swollen and painful, the splint may include the fingers and thumb as well. One should be cautioned against

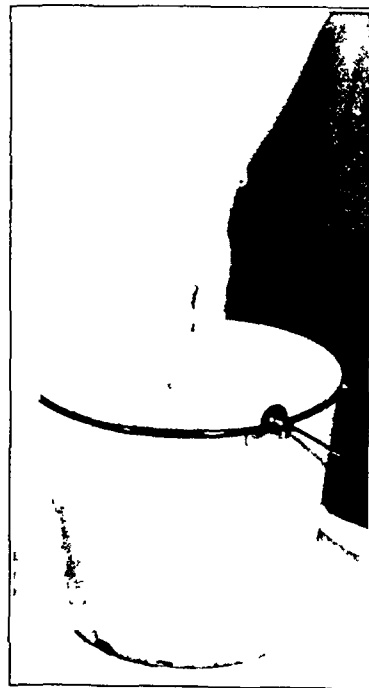


Fig. 8—Paraffin wax being applied to hand

6. Campbell, W. C.: *Operative Orthopedics*, St. Louis, C. V. Mosby Company, 1939.

7. Roberts, S. M., and Joplin, R. J.: *Arthroplasty of the Elbow*, New England J. Med. **216**: 646 (April 15) 1937.

making a so-called "chimpanzee type," or flat, hand. To avoid this the thumb must be placed in a position of apposition.

During the acute stage the splint may be worn constantly or, preferably, it may be removed at least once daily to allow motion or to permit other local therapeutic measures. In milder cases, however, the splint may be worn only at night. Such splinting greatly relieves pain, congestion and swelling. The use of hot fomentations during the acute stage aids in relieving pain and muscle spasm, which in turn lead to increased motion.

If deformity has already occurred, gradual correction by a series of cock-up splints, starting in the line of deformity and gradually bringing the wrist into dorsiflexion, as tolerated by the patient, often results in gaining increased motion. Should ankylosis appear

flexion of the proximal interphalangeal joints and hyperextension of the terminal interphalangeal joints.

A splint (fig. 7) well molded into the palmar arch and extending beyond the partially flexed fingers may prevent these deformities. Ulnar deviation may be

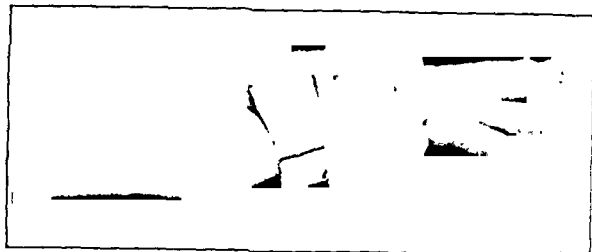


Fig. 11.—"Clam shell" plaster cuff used to prevent and correct subluxation of metacarpophalangeal joints.

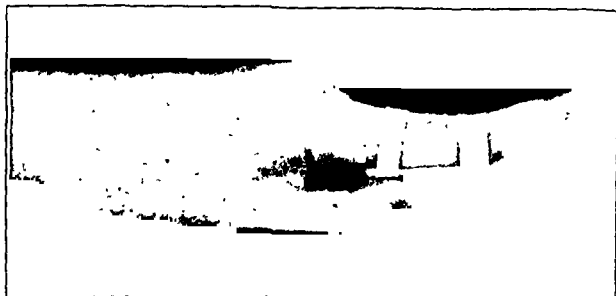


Fig. 9.—Holding of reduction by wooden splint fastened with adhesive tape.



Fig. 10.—Banjo splint with wire mesh finger stalls used to reduce subluxating interphalangeal joints.

inevitable, the wrist should be allowed to fuse in a useful position. Manipulation under anesthesia may be necessary to secure sufficient correction before the bones become firmly united. If ankylosis has taken place in a bad position, operative correction with fusion in 30 degrees dorsiflexion is most desirable.

HANDS

It is a most pitiful sight to watch an arthritic patient try to do simple chores when his fingers are in the deformed position of fixed ulnar deviation (fig. 6) and subluxation. These deformities greatly diminish the hand's functional usefulness and discourage dexterous efforts. The normal axis of rotation in flexion of each finger has been so changed that instead of their converging and pointing normally to the tubercle of the scaphoid they point more toward the pisiform bone. Furthermore the accompanying atrophy of the interossei and the lumbricales muscles results in dorsiflexion (or hyperextension) of the metacarpophalangeal joints,

avoided or corrected with the same splint by incorporating a flange on the ulnar edge or by making a plaster mitten into which the tips of the fingers fit snugly.

In both the acute and chronic stages of the disease, dipping the hand (fig. 8) in paraffin wax melted in a double boiler or pail is a most effective means of applying heat for the relief of pain and muscle spasm.

Paraffin wax is admirably adapted for this purpose since it has a hysteresis of about 15 degrees. Although its melting point is uncomfortably warm to one's touch, a container of melted wax may be allowed to cool until a thin film forms over its surface. At this point one can thrust one's hand into the liquid and instantly remove it without experiencing any discomfort. The resulting coating solidifies on exposure to the air. The hand may be dipped in and out of the pail four or five times to secure a thick glove. The heat slowly dissipates from the waxed glove in about one-half hour. It can then be peeled from the hand and replaced in the pot to be reused.

After the use of heat, the preservation of motion may be maintained by daily voluntary exercises: i. e., by flexing the fingers well into the palms of the hands and also bringing them into complete extension. A good finger and hand exercise results from simply squeezing a rubber ball or a rubber sponge several times daily. Also, when recovery is sufficiently advanced, the use of occupational therapy, such as needle work, cord weaving, putty molding or wood carving, will greatly increase motion and promote dexterity.⁸



Fig. 12.—Corset recommended for back support.

8. Marble, Henry: Rehabilitation Hand Clinic at Massachusetts General Hospital, personal communication to the authors in September 1940.

When subluxation of the interphalangeal joints has taken place, this may be corrected by simple manual traction and the reduction gained held by small wooden splints cut from throat sticks and fastened in place on the palmar surfaces of the fingers with adhesive tape (fig 9). Banjo splints (fig. 10) with adhesive finger traction, or the use of wire mesh finger stalls, are also useful.

One of the simplest splints, yet one of the most effective in preventing the interphalangeal as well as metacarpophalangeal subluxations, is the so-called "clam-shell" cuff (fig. 11) devised by Dr. Loring T. Swaim. It consists of a piece of felt and a plaster slab molded and allowed to harden about the subluxed joints in their corrected positions. After it has been allowed to dry, it is held on the hand with a webbing strap or an elastic band. It can be slipped off and on with ease.

Another common deformity is the aforementioned "flat hand" which is accompanied by the loss of the

These patients are usually beyond middle age. The roentgenogram reveals lipping or spurs at the ligamentous attachments. Treatment is relatively simple. These patients respond readily to heat, rest, support and correction of malposture, if this exists. Bed rest is



Fig. 14 —Apparatus for traction of cervical spine

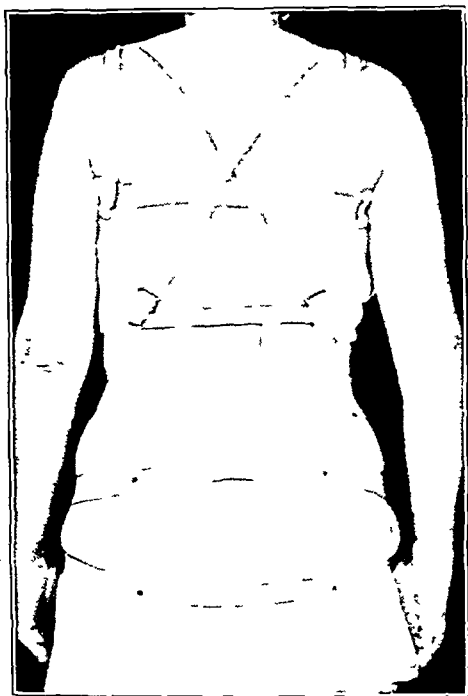


Fig. 13 —Low spring steel back support with elastic shoulder straps

palmar arch. This is caused by too much weight bearing on the outstretched hand, as in getting up from the bed or chair or by the faulty use of crutches. Prevention lies in teaching the patient the correct use of crutches and stressing the use of the hand in a grasping position of dorsal flexion rather than in extension. A cock-up splint, well molded into the palmar arch, or a snug fitting wrist strap that encircles the carpal bones is useful in treating this deformity.

If a hand must be stiff, the most useful position is one with dorsiflexion of the wrist, flexion at the metacarpophalangeal joints, partial flexion of the fingers and apposition of the thumb.⁹ If one remembers these criteria, preservation of some function of this important extremity will be preserved.

SPINE, NECK AND JAW

By far the largest number of painful backs fall into the so-called hypertrophic or osteoarthritic group.

⁹ Steindler, Arthur. *Orthopedic Reconstruction Work on Hand and Forearm*, Surg., Gynec. & Obst. 45: 476 (Oct.) 1927.

seldom indicated. Adhesive strapping usually gives immediate temporary relief. For women, back laced, nonelastic, supporting corsets (fig. 12) are usually sufficient. Occasionally an obese patient or one with more severe symptoms may require a flexible steel back brace with a firm abdominal pad in addition (fig. 13). Elastic shoulder straps may be added if the thoracic spine is involved. For men a back brace of exactly the same type is used except that peroneal straps may be substituted for the garters.

Whenever the vertebral joints are attacked in the rheumatoid or atrophic type of arthritis the resulting deformity is flexion, especially in the dorsal spine, with a tendency to reverse the normal lumbar curve. In the Marie-Strumpell type, which attacks the younger age group, the sacroiliac joints are affected first and often fuse solidly before the spinal column becomes involved.¹⁰ As the disease progresses, the rib articulations are attacked with the resultant limitation of chest motion and diminished vital capacity. The cervical spine has a tendency to flex forward until gradually the patient loses the ability to carry his head erect. Likewise the patient loses his ability to turn to either side without moving the entire body as a whole. A scoliosis rarely appears.

During the acute phases, hot fomentations and bed rest are desirable measures because they afford relief from muscle spasm and pain. Later, considerable relief

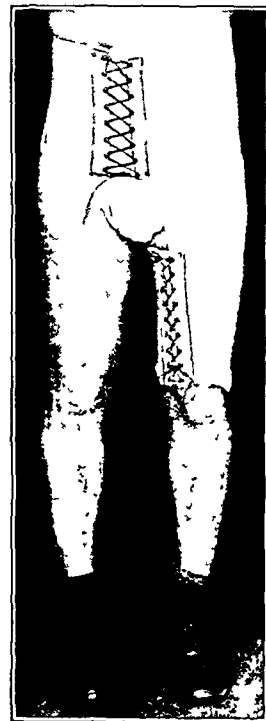


Fig. 15 —Light weight ambulatory hip spica

¹⁰ Swaim, L. T. *The Orthopedic Treatment of Strumpell-Marie Arthritis*, J. Bone & Joint Surg. 21: 983 (Oct.) 1939.

is afforded these patients by the continuous use of a rigid body jacket to immobilize the spine and to prevent deformity. In cases in which deformity already exists, such a jacket may aid in straightening the spine.¹¹ Swaim points out that the use of a rigid support of this

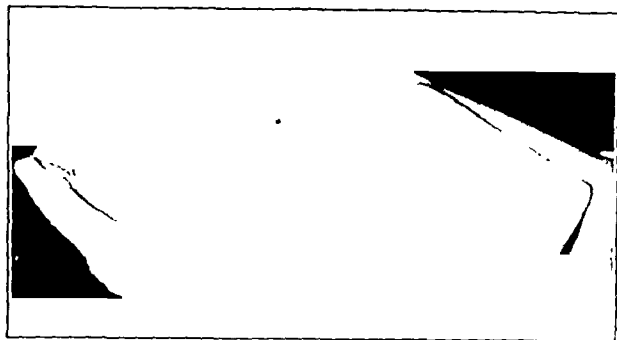


Fig. 16.—Plaster splint for resting lower extremity.

type not only corrects and prevents deformity but shortens the course of this disease.

It is important that these patients with spinal arthritis rest in bed on firm, even surfaces, because this in itself will tend to prevent flexion deformities. A three ply board, $\frac{1}{4}$ inch thick and 3 by 5 feet in size, for a single bed, placed between a thin hair mattress and the springs, will be found to be more comfortable than a thick soft bed.

If the patient is bedridden a simple plaster mold for the back may be sufficient, but the use of a rigid body jacket is better. The jacket should be laced in front to allow its removal once or twice daily for heat treatments to the spine and for the bath. It permits the patient to roll over in bed or to move about more freely.

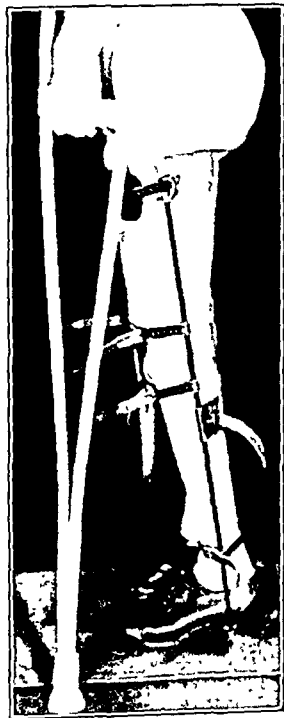


Fig. 17.—Caliper splint used to maintain and gain correction in flexion deformities of the knee.

may be resorted to; and the correction thus gained may be retained by the use of sandbags. Heat in the form of hot fomentations is efficacious in relieving the muscle spasm and pain.

11. Joplin, R. J.: *Technic of Making a Light Waterproof Jacket for the Treatment of Arthritis of the Spine*, Am. College Surg., Library of Motion Picture Films, Chicago, 1939.

Although arthritis of the temporomandibular joint occurs frequently, ankylosis is rare; but limitation of motion is frequent. The chewing of gum after the acute symptoms have abated tends to prevent limitation of motion.¹² Wooden or cork wedges inserted between the teeth may be found helpful in increasing the range of motion. Because arthroplasty of this joint is attended with a high degree of success, it is resorted to occasionally in the most severe cases.⁶ It is a difficult procedure which should be performed only by one accustomed to operating in this field.

HIP

Pain referred to the anterior thigh and mesial aspect of the knee may be the first symptom of arthritis of the hip. Examination may reveal a slight permanent flexion deformity and, after exercise, some muscle spasm.

Permanent flexion deformity with muscular atrophy is inevitable unless it is prevented by proper measures.

Either prevention or correction of permanent hip flexion may be obtained by having the patient lie prone in bed at least once each day, starting with one or two pillows beneath the abdomen. As the pillows are gradually removed, the hip will assume a neutral position from the stretching of the anterior structures. Slight flexion deformities can be corrected by hot fomentations accompanied by traction in the line of deformity.

A simple device to preserve muscle tone may be arranged by supporting the leg in a padded canvas cuff suspended by an elastic cable from an overhead bed frame. The patient can do so-called bicycle exercises almost as effectively as though he were placed in a Hubbard tank.¹³

A plaster cast in the form of a unilateral or bilateral spica is effective in securing relief from an acutely painful joint. It may be used also in correcting any deformity that may have taken place, provided it is changed or altered frequently until a good position is secured. In atrophic or rheumatoid arthritis, long immobilization in one position may produce diminished motion, but in osteoarthritis or hypertrophic arthritis there is less danger of such stiffness resulting. When a good position is obtained a permanent, ambulatory type of light weight spica (fig. 15) may be worn. This may be removed at times to permit active or guided motions and other physical therapeutic measures.

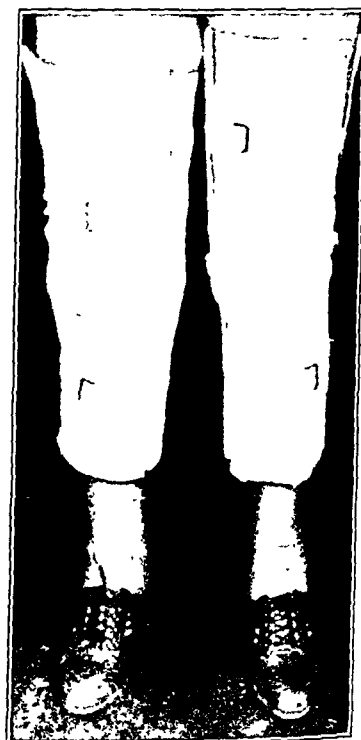


Fig. 18.—Plaster cylinders for knee support.

12. Bayles, T. B., and Russell, L. A.: *The Temporomandibular Joint in Rheumatoid Arthritis*, J. A. M. A. 16: 2842 (June 28) 1941.
13. Elliston, W. A.; Silber, Marie F., and Grover, Dorothy: *Physiotherapy in Rheumatoid Arthritis*, New England J. Med. 224: 150 (Jan. 23) 1941.

If painful hip motion is still present after conservative therapeutic measures have been exhausted, or, if ankylosis has occurred in a poor position, an arthroplasty with a vitallium cup¹⁴ may give a painless, movable joint. When ankylosis is inevitable and the general condition of the patient does not warrant an operation, the hip should be allowed to fuse in slight flexion, without rotation, and in about 10 degrees abduction.⁶

KNEES

The knee is the largest joint in the body. Because it is a weight bearing structure it is frequently attacked. The first signs of impending deformity are pain, swelling and permanent flexion.

Atrophy of the muscles and ligaments about the joint appears rapidly. Subluxation of the tibia on the femur may occur as the fluid subsides. The joint space usually becomes narrowed and the patella is often fixed against the femoral condyles, where fusion occasionally takes place. Contracture of the hamstring muscles, joint cap-

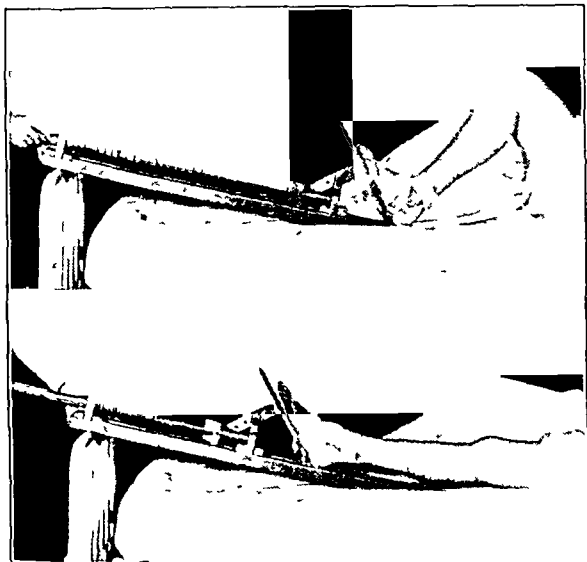


Fig. 19.—So called "knee push machine," consisting simply of a board on which a foot rest slides in a dovetail groove. A coil spring wound around a wooden pole which slides through a stationary end block provides slight resistance.

sule and periarticular structures results. Ankylosis in chronic arthritis, especially of the osteo or hypertrophic type is rare but it frequently follows the acute suppurative joint disease such as that due to gonorrhea.

In the acute stage of rheumatoid arthritis of the knee, flexion deformity may be prevented and pain lessened by the use of a posterior splint worn almost constantly while the patient is in bed (fig. 16). This splint should be removed at least once every twenty-four hours to allow guided or active motion through as full a range as possible to prevent adhesions. This is most effective following the use of hot fomentations.

Flexion deformities may be corrected by the application of solid plaster leg casts applied in the position of maximum correction and kept on for forty-eight hours. These should then be bivalved and removed, and the joints moved through as full a range of motion as possible. The posterior half of the bivalved casts are used as resting shells. Seventy-two hours should elapse before further correction is attempted. In the interim daily heat, massage and active or guided motion may

be carried out. Balanced traction, the hinged cast method and the use of wedged cylinders or Turner irons may all be valuable at times in correcting such deformities. When maximum correction has been gained by any of the methods mentioned, a caliper splint (fig. 17) may be fitted to retain the extension



Fig. 20.—Foot supported by spring steel arch support covered with thin leather.

gained or even to secure further corrections. This method allows the patient to be ambulatory.

After correction has been attained for a bedridden patient and weight bearing is ready to be started, the knee joint must be carefully protected and supported because of the weakness of the quadriceps muscles and other periarticular structures. For the more severe cases, a rigid cylinder, with a hole for the patella (fig. 18) may be used to support the joint during weight bearing until the quadriceps muscles are strong enough. For the simpler cases with good quadriceps muscles an elastic bandage with a felt strip on either side of the patella will give adequate support. Daily use of elastic overhead traction,¹²

"knee-push" apparatus (fig. 19) or heat and massage to tone up weakened and atrophied muscles constitute further aids in rehabilitation. A step further in this direction would be the use of occupational therapeutic devices, such as the treadles on looms and the pedals on jig saws.

FEET

The arthritic patient who possesses a foot under constant strain finds it less resistant to the disease.¹⁵ A foot

with well protected arches is not so likely to be attacked. Furthermore, if deformities are present at either the hip or the knee there may be a resulting foot strain. For example, permanent flexion of the knee may produce a sufficient strain on the metatarsal heads to produce acute pain. External rotation of the leg leads



Fig. 21.—Figure of eight ankle straps.

¹⁴ Smith Petersen, M. N.: Arthroplasty of the Hip—A New Method, *J. Bone & Joint Surg.* 21: 269 (April) 1939.

¹⁵ Kuhns, J. G., and Swann, L. T.: The Prevention of Deformities in Chronic Arthritis, *J. A. M. A.* 93: 1853 (Dec. 14) 1929, 94: 1123 (April 12) 1930 and 94: 1743 (May 31) 1930.

to pronation or longitudinal arch strain. When a patient has been confined to bed for a long time the muscles and ligaments become relaxed and foot strain appears on weight bearing. In all such instances the feet must be well protected by arch supports (fig. 20) and strengthened by exercises. Foot hygiene must be just as carefully carried out in the arthritic as in the diabetic patient.

With the onset of arthritis in the ankle or tarsal joints, protective muscle spasm appears and tends to pull the foot into a valgus position. Furthermore, the pull of the gastrocnemius muscle, aided by the force of gravity and the weight of the bed clothes, tends to thrust the foot into an equinus position. This resultant equinovagis deformity not only causes the front arch to be depressed during weight bearing but leads to a cocking-up of the toes as well. In time, so-called hammer toe deformities are present.

In the acute phase, when the feet are swollen and painful, weight bearing is definitely contraindicated. In such cases a plaster boot that extends from below the knee to just proximal to the metatarsal heads on the plantar surface and to the tips of the toes dorsally is usually worn with comfort. It must be bivalved so that the foot may be removed for daily motion or physical therapy. The bed clothing must be held off the feet, preferably by a cradle or by a pillow or a broad board

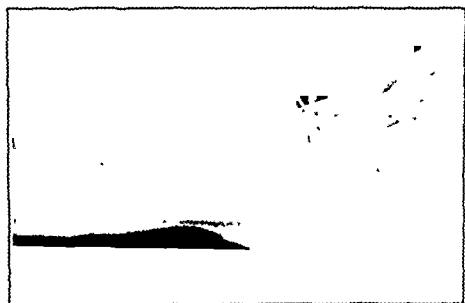


Fig. 22.—Anterior arch cuff made of soft leather.

placed at the foot of the bed. Foot exercises should be taught these patients as soon as the foot is pain free.

Weight bearing is allowed when swelling and pain have disappeared, provided the feet are equipped with good shoes and arch supports. So-called figure of eight walking straps (fig. 21) may give additional support to the foot and prevent widening of the ankle. The acute bursitis accompanying hallux valgus deformities may be prevented by a simple foot cuff (fig. 22) worn just proximal to the heads of the metatarsals.

If deformities have taken place, they may be corrected by serial plaster casts left on for forty-eight hours. These are then bivalved to permit motion and physical therapy. A new attempt at correction can then be made in seventy-two hours. Manipulations under anesthesia are helpful in gaining better positions, but these should be held in plaster for four to six days. In the most refractory cases operative measures, such as a fusion or a radical correction of hammer toes, may be resorted to.

Too much cannot be said about properly fitting shoes for any patient with foot disturbances, especially arthritis. The shoe should grip the longitudinal arch and possess sufficient width and length to avoid crowding the toes. In women's shoes it is important to have a wide base heel to prevent instability.

SUMMARY

Preventive and simple corrective measures are available for the treatment of arthritic joints. Flexion deformities can be prevented and joint motion maintained in a great proportion of the cases if early and persistent treatment is given. When deformities have occurred, corrective measures may be instituted with the assurance of some improvement. When fusion is inevitable the joint should be allowed to ankylose in the optimum functional position.

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THE PREVALENCE OF MALNUTRITION

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Recent estimates of the prevalence of malnutrition in the United States have varied so greatly that the Food and Nutrition Board of the National Research Council has assigned to us, as a subcommittee, the task of evaluating existing evidence on this question. Among the reasons for the widely varying estimates is the lack of criteria for the diagnosis of malnutrition. It is therefore necessary before discussion of the evidence that terms be defined.

DEFINITIONS

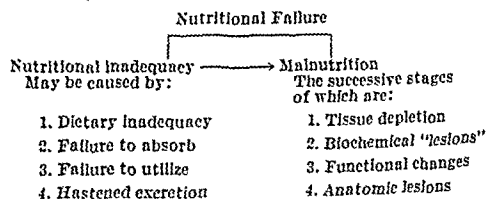
"Nutritional failure" exists as soon as adequate amounts of an essential nutritional factor or factors fail to reach the "milieu interne."

"Dietary inadequacy" means the failure to ingest an essential nutritional factor or factors in amounts sufficient to meet the existing requirement of the body.

"Nutritional failure" means not only the failure to ingest, i. e.

to retain and to utilize an essential nutritional factor or factors in amounts sufficient to meet the existing requirements of the body.

"Malnutrition" is a bodily condition, detectable by any method of examination, caused by a nutritional inadequacy.



In accordance with these definitions, nutritional failure consists not only of disease entities sufficiently advanced to cause the florid manifestations of malnutrition such as pellagra, beriberi, scurvy, rickets and ophthalmia, but any stage of a sequence or chain of events as illustrated in the tabulation. The first link in the chain is nutritional inadequacy followed after variable periods of time by malnutrition, the successive stages of which

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are tissue depletion, biochemical "lesions," functional changes and finally anatomic lesions.¹

The evidence on the prevalence of malnutrition is of three kinds: (1) food consumption records or dietary surveys, (2) official death rates and hospital admission figures, and (3) medical assessments of the nutritional status in samples of the population. These three methods should not be expected to yield identical information. Even when each is as fully developed and as accurately interpreted as possible, the result can only show trends reasonably parallel.

EVIDENCE FROM FOOD CONSUMPTION RECORDS AND DIETARY SURVEYS

Studies of food consumption do not show directly the nutritional status as a body condition, i. e. malnutrition, but they do show what proportion of families in the sample of population studied have a dietary inadequacy. These studies relate directly to this first link, while the most precise method of diagnosing malnutrition relates to some later link. The yardsticks or criteria adopted for an adequate diet influence the apparent incidence of dietary inadequacy. If the criteria adopted are such that the diets will just support life, then the figure expressing the apparent incidence of inadequate diets will be minimal. If the criteria adopted for an adequate diet are such as will prevent malnutrition under ordinary physiologic conditions, the apparent incidence of inadequate diets will be larger. If the criteria are such as will promote optimal health and well being, the number of apparently inadequate diets recorded will be largest.

The Bureau of Home Economics of the Department of Agriculture,² for example, has food consumption records of over two thousand families of wage earners, clerical workers and nonrelief, nonsharecropper farm families from all sections of this country. This survey found that 43.6 per cent of these families (59.5 per cent city, 16.3 per cent farm) failed to receive a "fair" ³ diet, and 76.2 per cent (92.1 per cent city, 49.0 per cent farm) failed to receive a "good" ⁴ diet. Unfortunately the Bureau of Home Economics has not yet published the incidence of diets failing to reach the Recommended Daily Allowances for Specific Nutrients ⁵ adopted by the Committee on Food and Nutrition of the National Research Council and approved by the Council on Foods and Nutrition of the American Medical Association.⁶ These recommended allowances are not significantly different from the Bureau of Home Economics standards for a "good" diet, except that the allowances of thiamine and riboflavin are higher. This newer yardstick would probably increase the number in the group not obtaining a satisfactory diet.

1. Jolliffe, Norman: Treatment of Neuropsychiatric Disorders with Vitamins, J. A. M. A. 117: 1496 (Nov. 1) 1941.

2. Stuebeling, H. K., and Phipard, E. F.: Diets of Families of Employed Wage Earners and Clerical Workers in Cities, Circular 507, U. S. Dept. of Agriculture, 1939. Stuebeling, H. K.; Monroe, D.; Coons, C. M.; Phipard, E. F., and Clark, F.: Family Food Consumption and Dietary Levels, Misc. Pub. 405, U. S. Dept. of Agriculture, 1941. Stuebeling, H. K., and Coons, C. M.: Present Day Diets in the United States, in Food and Life, Yearbook of Agriculture, U. S. Dept. of Agriculture, Washington, D. C. 1939, table 3, p. 296.

3. The Bureau of Home Economics' standard for a "fair" diet for a standard person consisted of protein 45 Gm., calcium 0.45 Gm., phosphorus 0.88 Gm., iron 10 mg., vitamin A 3,000 international units, vitamin B₁ 250 international units, ascorbic acid 37 mg. and riboflavin 0.9 mg.

4. The Bureau of Home Economics' standard for a "good" diet for a standard person consisted of protein 67 Gm., calcium 0.68 Gm., phosphorus 1.32 Gm., iron 15 mg., vitamin A 6,000 international units, vitamin B₁ 500 international units, ascorbic acid 75 mg. and riboflavin 1.8 mg.

5. Recommended Allowances for Various Dietary Essentials, Committee on Food and Nutrition, National Research Council, J. Am. Diet. A. 17: 565 (June July) 1941.

6. Report of Council on Foods and Nutrition Dealing with the National Nutrition Conference for Defense, J. A. M. A. 116: 2783 (June 21) 1941. Report of Reference Committee on Executive Session, *ibid.*, p. 2796.

In evaluating this dietary survey it should be pointed out that the records of food consumed were based on food entering the home and did not take into account waste, cooking losses (which may be very high for ascorbic acid and thiamine) or food (other than meals) and beverages purchased and consumed away from home. The first two unaccounted factors would tend to decrease the actual intake of the specific nutrients as against the recorded intake. The latter factor in some instances would add significantly to the nutritive quality of the diets, while in other instances the consumption of vitamin-free foods such as candy and carbonated and alcoholic beverages would depress the nutritive quality of the diets. It should also be pointed out that this survey did not include unemployed persons on relief, WPA workers, sharecropper farm families or high income families. While it may be imprudent to accept surveys of but few more than two thousand families, however well selected by sound sampling procedures, as representative of nearly thirty-five million families,⁷ it should be pointed out that all surveys, whether conducted by private or by governmental agencies, both in the United States and Canada, are in general agreement that there is a high proportion of poor diets among the employed population.

EVIDENCE OF OFFICIAL MORTALITY RATES

Evidence based on official mortality rates (table 1) at best can furnish only information on the prevalence of the terminal link in the chain of nutritional

TABLE 1.—Deaths from Various Causes in the United States Registration Area, 1933-1938

Cause of Death	1938	1937	1936	1935	1934	1933
Pellagra	3,205	3,258	3,740	3,543	3,602	3,955
Beriberi	42	21	11	7	5	1
Scurvy	30	27	33	30	36	28
Rickets	244	235	270	261	292	339

failure, i. e. anatomic lesions; and of these only the irreversible, or rather the unreversed, appear since they represent in many instances therapeutic failures in recognized cases. These rates as published, however, do not furnish a reliable index even of deaths from malnutrition. This is due in part to nonrecognition of these and of other nutritional factors causing death, in part to mislabeling and in part to the statistical practice of giving precedence to certain diseases as causes of death over others. It would be interesting to know how much malnutrition is concealed in the 370,600 deaths recorded in 1938 under the heading "diseases of the circulatory system" or in the 75,431 deaths entered under its subclassification "diseases of the heart, unspecified," or among the 2,569 deaths listed as due to "alcoholism" or to know how much is masked by the nomenclature of "senility," "cirrhosis of the liver" ⁸ and "psychoses."

Another important factor in evaluating this type of evidence is that the morbidity rates for malnutrition are

7. The 1940 census gives 34,861,625 occupied dwelling units, which we have taken as approximating the number of families.

8. Jolliffe, Norman, and Jellinek, E. M.: Vitamin Deficiencies and Liver Cirrhosis. Part VII. Cirrhosis of the Liver, Quart. J. Studies on Alcohol 2: 544 (Dec.) 1941. Daft, F. S.; Sebrell, W. H., and Lillie, R. D.: Production and Apparent Prevention of a Dietary Liver Cirrhosis in Rats, Proc. Soc. Exper. Biol. & Med. 48: 228 (Oct.) 1941. Diet and Cirrhosis of the Liver, Current Comment, J. A. M. A. 117: 1542 (Nov. 1) 1941.

9. In the Medical Service of the Psychiatric Division of Bellevue Hospital alone, in a recent five year period, 94 deaths were recorded as "alcoholic encephalopathy" which we now know were due to nicotinic acid deficiency (Jolliffe, Norman; Bowman, K. M.; Rosenblum, L. A., and Fein, H. D.: Nicotinic Acid Deficiency Encephalopathy, J. A. M. A. 114: 307 [Jan. 27] 1940. These deaths entered the official mortality statistics under the heading of either "alcoholism" or "psychoses."

high in proportion to the mortality. For example, Goldberger and his associates¹⁰ estimated on the basis of a survey in 1917 that there were at least 33 cases of pellagra for each death reported. Sebrell¹¹ has recently pointed out that this figure is too low, for at that time only pellagra with cutaneous manifestations was recognized. A further factor tending to decrease the ratio of mortality to morbidity in recent years is the improvement in methods of care. Independently, both Sydenstricker and Sebrell arrived at an estimate of 100,000 cases of active pellagra in the United States in 1938.¹²

It is therefore our opinion that the mortality rates published by the Bureau of Vital Statistics do not indicate the true death rate from classic deficiency dis-

labeling and precedence given to certain diseases over others. In addition, two other factors make this index unreliable. The first is that the hospitalized population is not a representative group, for, like persons with the common cold, patients with malnutrition enter the hospital only when sequelae develop; on discharge neither the common cold nor malnutrition but only the sequelae appear as the discharge diagnoses. The second is that certain anatomic lesions of malnutrition may be so prevalent that they are disregarded. This is paralleled by the practice of recording other highly prevalent conditions. For example, in 1938, according to Bellevue Hospital records,¹³ dental caries was recorded in only 0.68 per cent of its patients, whereas it is common knowledge

TABLE 2.—*Gross Evidences of Malnutrition*

System	Finding	Suggested Deficiency or Syndrome	Reference
Eyes	Xerosis conjunctivae and corneae Central ophthalmoplegia	Vitamin A Thiamine	Kruse ²⁹ Jolliffe ³¹ Jolliffe, Wortis and Fein: <i>Arch Neurol & Psychiat.</i> 40 :569 (Oct) 1941. Wortis, Baedling, Stein and Jolliffe: <i>Pyruvic Acid Studies in Wernicke Syndrome</i> , to be published.
Mucous membranes	Scarlet red stomatitis and glossitis with or without secondary Vincent's infection Magenta glossitis Atrophic glossitis	Nicotinic acid Riboflavin Nicotinic acid, B complex, addisonian anemia, Plummer Vincent syndrome	Spies, Vilter and Ashe ²² Rosenblum and Jolliffe, <i>J. A. M. A.</i> 17 :224 (Dec 27) 1941. King: <i>Lancet</i> 1 :32 (July 13) 1940 Spies, Vilter and Ashe ²² Sebrell, <i>Ann. Int. Med.</i> 15 :933 (Dec) 1941 Spies, Vilter and Ashe ²² Youmans ²⁵
	Scorbutic gums Cheliosis . . .	Ascorbic acid Riboflavin	Youmans ²⁵ Spies, Vilter and Ashe ²² Sebrell and Butler: <i>Pub. Health Rep.</i> 53 :225J (Dec. 30) 1938 Jolliffe, Fein and Rosenblum: <i>New England J. Med.</i> 221 :921 (Dec 14) 1939
Skin	Nonspecific urethritis, balanitis, vaginitis Pellagrous dermatitis Seborrheic lesions in nasolabial folds on face, behind ears and in skin folds Hyperkeratosis and hyperfolliculosis Hemorrhagic manifestations Fissures in angles of mouth	Nicotinic acid Nicotinic acid Riboflavin Vitamin A Vitamin K, ascorbic acid Riboflavin	Spies, Vilter and Ashe ²² Spies, Vilter and Ashe ²² Spies, Vilter and Ashe ²² Jolliffe, Fein and Rosenblum, <i>New England J. Med.</i> 221 :921 (Dec 14) 1939 Sydenstricker ³² Youmans ²⁵ Butt and Snell: <i>Vitamin K</i> , W. B. Saunders Company, 1941 Youmans ²⁵ Rall: <i>Medicine</i> 20 :251 (Sept.) 1941 Spies, Vilter and Ashe ²² Sebrell and Butler: <i>Pub. Health Rep.</i> 53 :225J (Dec 30) 1938 Jolliffe, Fein and Rosenblum: <i>New England J. Med.</i> 221 :921 (Dec 14) 1939 Sydenstricker ³²
Neurologic	Characteristic bilateral symmetrical polyneuropathy Combined system syndromes . Wernicke's syndrome Nicotinic acid deficiency encephalopathy Progressive stupor and hebeticude Certain organic reaction psychoses	Thiamine Thiamine, B complex, addisonian anemia Thiamine, B complex Nicotinic acid Nicotinic acid Nicotinic acid, thiamine and B complex	Spies, Vilter and Ashe ²² Sebrell, <i>Ann. Int. Med.</i> 15 :933 (Dec) 1941 Jolliffe ¹ Strauss ¹⁷ Jolliffe ¹⁷ Jolliffe ¹⁸ Youmans ²⁵ Jolliffe ¹⁸ Romano ³¹ Sebrell, <i>Ann. Int. Med.</i> 15 :933 (Dec) 1941. Sydenstricker ³² McLester, <i>Nutrition and Diet in Health and Disease</i> , ed 3, W. B. Saunders Company, 1940. Jolliffe, Wortis and Fein: <i>Arch Neurol & Psychiat.</i> 40 :569 (Oct) 1941 Jolliffe, Bowman, Rosenblum and Fein ⁹ Cleckley, Sydenstricker and Geeslin: <i>J. A. M. A.</i> 112 :2107 (May 27) 1939 Cleckley, Sydenstricker and Geeslin: <i>J. A. M. A.</i> 112 :2107 (May 27) 1939 Jolliffe, Bowman, Rosenblum and Fein ⁹ Wortis and Jolliffe: <i>New York State J. Med.</i> 14 :1461 (July 15) 1941 Jolliffe ¹⁸
Skeletal	Rachitic deformities and osteomalacia	Vitamin D, calcium, phosphorus	McLester, <i>Nutrition and Diet in Health and Disease</i> , ed 3, W. B. Saunders Company, 1940. Youmans ²⁵ Hees ²¹
General	Underweight, underheight, edema, pallor	Calories, proteins, iron, B complex	McLester: <i>Nutrition and Diet in Health and Disease</i> , ed 3, W. B. Saunders Company, 1940 Youmans ²⁵

cases. Even the apparent rising incidence in death attributed to beriberi, from 1 in 1933 to 42 in 1938, suggests this; for it is unlikely that there has been a many-fold increase in fatal thiamine deficiency during this period, and the statistical increase must be ascribed to increasing recognition and better diagnosis. It is thus probable that deaths actually due to malnutrition are many times greater than the mortality statistics indicate.

EVIDENCE FROM HOSPITAL ADMISSION RATES

Evidence based on hospital record room figures are subject to the same criticism as the official mortality rates, i. e. incompleteness due to nonrecognition, mis-

that the incidence of dental caries in the adult population is near 90 per cent.

Recognition of vitamin deficiencies in hospital patients has recently been tabulated by questionnaires completed by the Massachusetts General Hospital, Johns Hopkins Hospital, County Hospital (Santa Barbara, Calif.), University of Kansas Hospitals and the Kansas City General Hospital, and published in *THE JOURNAL*.¹⁴ In a combined total of 338,406 admissions to these hospitals (including 80,000 outpatients at the University of Kansas Hospitals), vitamin deficiency was recorded in but 483 cases, an incidence, we have calculated, of 1.43 per thousand admissions.

Figures from Bellevue Hospital, Boston City Hospital, Cincinnati General Hospital, Hillman Hospital and

10. Goldberger, Joseph; Wheeler, G. A.; Sydenstricker, Edgar, and King, W. I.: A Study of Endemic Pellagra in Some Cotton Mill Villages of South Carolina, *Bull.* **153**, Hyg. Lab., U. S. P. H. S., 1929.
11. Sebrell, W. H.: Nutritional Diseases in the United States, *J. A. M. A.* **115**:851 (Sept. 7) 1940.
12. *Proc. Seventeenth Annual Conf. Milbank Memorial Fund*, 1939

13. Annual Report, Bellevue Hospital, 1938.
14. Clendenning, Logan: The National Nutrition, Correspondence, *J. A. M. A.* **117**:1035 (Sept 20) 1941.

the university hospitals of Duke, Georgia and Vanderbilt would, we believe, have given a higher rate. For example, in 1938, of 35,813 patients¹⁵ discharged from the general divisions of Bellevue Hospital¹³ a specified vitamin deficiency was recognized in 197, or 5.5 per thousand. In addition, malnutrition due to deficiency of unspecified nutrients was recorded in 210 cases, a rate of 5.9 per thousand. Furthermore, there were 219 patients whose anemia was recorded as due to deficient intake of iron, a rate of 6.1 per thousand.¹⁶ We thus have in Bellevue Hospital a recorded rate of malnutrition of 17.5 per thousand discharges. Even this figure includes only the most striking cases of malnutrition, for at Bellevue, as in other hospitals, most cases of malnutrition are not recorded. The prevalence of certain well recognized syndromes due to dietary inadequacy is greater in hospital patients than the total rate recorded by hospital record rooms. For example, the following groups of clinical states seldom if ever appear in record room

pneumonia, advanced tuberculosis, delirium, ulcerative colitis, toxemias of pregnancy, gastrointestinal malignancy and liver cirrhosis is common. It is probable that these findings are usually observed and can be found recorded in the body of the hospital record. However, they seldom if ever appear in record room compilations.

The prevalence of nutritional polyneuropathy in patients having alcoholism, diabetes, pregnancy, gastrointestinal cancer, cirrhosis of the liver and long continued fevers is decidedly common but is customarily recorded as "alcoholic," "gestational," "diabetic," "cachectic," "infectious" or "toxic," "neuritis."¹⁷ Cases with such manifestations of malnutrition are not included in the hospital rates as evidence of malnutrition. Another possibility is that the diagnosis of polyneuropathy is usually not made in the absence of foot and wrist drop, muscle atrophy and complete areflexia; yet it is recognized by numerous authorities that polyneuropathy can

TABLE 3—Prevalence of Secondary (Iron Deficiency) Anemia

Subjects		Criteria	Percentage Deficient	Reference
Ann Arbor	1,08 pregnant women (urban)	Hb 10 Gm per 100 cc. C I 0.9 C Hb. 26×10^{12} G	26.6	Bethall, Gardiner and Mackinnon. Ann Int. Med. 13:91 (July) 1939
New York City	(a) 325 pregnant women—iron therapy (b) 307 pregnant women—no iron therapy	R B C 4,000,000* Hb 11.6 Gm per 100 cc.	(a) 28 (b) 72	Labate Am J Obst & Gynec. 38:48 (July) 1939
Oklahoma City	1,000 private obstetric patients	(a) R B C 3,500,000 (b) Hb 10.2 Gm. per 100 cc	(a) 16.4 (b) 9.2	Eskridge and Serwer. South M J 32:24 (Jan) 1939
United States	Pregnant women (review).	"Iron deficiency anemia"	30.60	Gordon: Kentucky M. J 38:415 (Sept) 1940
New York City	(a) 336 private school children (b) 425 public school children (c) 138 WPA employees	Boys, 13, and all girls, 12 Gm Boys, 13 yrs., 12.8 Gm to 13.5 Gm Hb 14 Gm per 100 cc. Hb 12 Gm per 100 cc	(a) 1.5 (b) 3.3 (c) 3.4	Wiehl Milbank Memorial Fund Quart 19:45 (Jan) 1941 Wiehl and Kruse ³⁰
Pennsylvania	428 school children (representative economic section)	Hb 11.5 Gm per 100 cc Hb 10.0 Gm per 100 cc	57 13	Zayas, Mack, Sprague and Bauman: Child Development 11:1 (Jan) 1940
Florida	620 rural school children (6-10 yrs.)	Hb 11.7 Gm per 100 cc Hb 9.6 Gm per 100 cc Hb 11.7 Gm per 100 cc Hb 9.6 Gm per 100 cc	85.2 57.2 77.4 33.4	Abbott and Ahmann. Am J Dis. Child 58:811 (Oct) 1939
Pennsylvania	2,400, all ages Preschool School Adult	Hb 11.5 Gm per 100 cc Hb 10.0 Gm per 100 cc Hb 11.5 Gm per 100 cc Hb 10.0 Gm per 100 cc Hb 11.5 Gm per 100 cc Hb 10.0 Gm per 100 cc	Male 51 Female 56 ± 20 ± 20 14 26 5 4 20 30 ± 15 ± 15	Mack, Smith, Logan, O'Brien, Shaw and Dodds: Milbank Memorial Fund Quart 19:282 (July) 1941
New York City	100 hospital patients (medical)	Hb 10.2 Gm. per 100 cc	23	Scott and Janeway. New York State J. Med. 40:440 (March 15) 1940

figures of malnutrition: hypoproteinemia; microcytic hypochromic anemia, macrocytic hyperchromic anemia; deficiency stomatitis and glossitis; nutritional polyneuropathy. The rate of malnutrition, if these groups were thus recorded on the discharge card, would be many times greater than 1.4 per thousand. It is true that increased excretion or failure of formation accounts for significant numbers of hypoproteinemias; that bleeding, infection and malignancy account for significant numbers of microcytic hypochromic anemias; that deficiency of the "intrinsic" factor and liver cirrhosis account for many macrocytic anemias; there remain, however, significant numbers of cases in which these findings can be explained only by dietary inadequacy of protein, iron, "extrinsic" factors or vitamins. The development of a scarlet red stomatitis or a glossitis due to a deficiency of nicotinic acid and of other B vitamins postoperatively and during such illnesses as

express itself by only bilateral calf muscle tenderness, plantar dysesthesia, impaired vibratory sensation in the toes and absence of ankle jerks¹⁸ These criteria occurred in approximately 22 per cent of the alcoholic patients entering Bellevue Hospital,¹⁹ in 17 per cent of those entering Boston Psychopathic Hospital²⁰ and in 30 per cent of those entering Colorado Psychopathic Hospital.²¹ According to the same criteria, 2.1 per cent of ambulatory diabetic patients attending the Third Medical Division diabetic clinic at Bellevue Hospital²² had a polyneuropathy which disappeared following the daily oral administration of 10 mg. of thiamine alone. It is thus obvious that much clinically evident malnutri-

15. The figures from the Psychiatric Division of Bellevue Hospital are omitted because these figures would include (1) the 12,000 alcoholic admissions, in which malnutrition is very prevalent and (2) the 3,000 admissions to the Medical Service of the Psychiatric Division, where the staff is actively interested in this problem.

16. This figure does not include macrocytic anemias, anemias due to poor food absorption, unknown cause, infections, blood loss, surgical conditions and prematurity, or anemias associated with blood dyscrasias.

17. Strauss, M. B. Therapeutic Use of Vitamin B₁ in Polyneuritis and Cardiovascular Conditions. Clinical Indications, J. A. M. A 110:953 (March 26) 1938. Jolliffe, Norman. A Clinical Evaluation of the Adequacy of Vitamin B₁ in the American Diet, Internat. Clin. 4:46 (Dec.) 1938.

18. Jolliffe, Norman. Clinical Aspects of Vitamin B Deficiencies, Minnesota Med 23:542 (Aug) 1940.

19. Jolliffe, Norman, and Goodhart, Robert: Beriberi in Alcohol Addicts, J. A. M. A 111:380 (July 30) 1938.

20. Secunda, L., and Trowbridge, E. H.: Personal communication to the authors.

21. Romano, John. Deficiency Syndromes Associated with Chronic Alcoholism, Am J M Sc 194:645 (Nov) 1937.

22. Fein, H. D.; Ralli, Elaine P., and Jolliffe, Norman. Peripheral Neuropathy Due to Vitamin B₁ Deficiency in Diabetes Mellitus, J. A. M. A 115:1973 (Dec 7) 1940.

tion, if looked for, could have been detected without special technics.

The evidences of malnutrition of a gross nature that can be detected by a bedside examination without the aid of any laboratory technics have been listed in table 2, along with the deficiency which their presence suggests and references to the literature. It is implicit in their presentation that no single physical sign is necessarily diagnostic until evaluated in the light of other signs and symptoms, until other possible causes have been ruled out and the diagnosis confirmed. If these signs were routinely observed and recorded in all cases and their implications investigated, the apparent prevalence of malnutrition in hospital and office practice, simply by improved recognition, would probably be increased many times.

EVIDENCE FROM MEDICAL ASSESSMENT OF THE NUTRITIONAL STATUS OF POPULA- TION GROUPS

The evidence gathered by this procedure includes (1) the florid manifestations of deficiency diseases as represented by the classic syndromes of beriberi, pellagra,

nancy, tuberculosis, malignant growths, heart disease and syphilis, so it is hoped that further developments of specialized technics will lead to the recognition of malnutrition before it has advanced to the stage of anatomic lesions.

It is obvious, therefore, that in the present state of our knowledge concerning the diagnosis of malnutrition due to many of the specific nutritional factors a wide borderline zone exists between nutritional inadequacy and diagnosable malnutrition. This borderline zone is often designated as "subclinical." As soon as a technic becomes available for the diagnosis of a manifestation it is no longer subclinical. The term "subclinical" has also been used to designate recognizable anatomic malnutrition that is subgross, such as capillary invasion of the cornea and some conditions that do not seem to be critical, such as cheilosis and mild rickets. This use is obviously incorrect, for these lesions are clinical and need only to be looked for to be found. In addition, the term has been used both as a cloak for ignorance and as a keynote for derision. For these reasons it should be dropped.

Data based on surveys which include examinations of populations for evidence of malnutrition are only now beginning to appear and are necessarily far from complete. Studies now under way, such as the cooperative studies by the Milbank Memorial Fund in New York City and in workers in defense industries elsewhere; and those under the auspices of the Rockefeller Foundation in North Carolina, Tennessee and Canada have been reported only in preliminary notes.

IRON DEFICIENCY ANEMIA

Statistics on the prevalence of iron deficiency (hypochromic) anemia in the American population are not nearly as complete as the figures available for the British Isles. All surveys, however, show a notably high incidence, especially in children and pregnant women of the lower income groups. In table 4 are listed some of the more recent surveys, indicating findings of anemia in from 1.5 to 85 per cent of children, 3.6 to 30 per cent during adult life and 9 to 72 per cent in pregnancy. It is recognized that chronic blood loss, malignant conditions and possibly factors other than an inadequate intake of iron may result in hypochromic anemia. However, in studies of large groups, particularly of school children, it is probable that the prevalence of hypochromic anemia is a reasonably accurate index of a dietary inadequacy in iron.

THE PREVALENCE OF RICKETS

With the development of knowledge of the cause and prevention of this disease, the prevalence of severe rickets has been greatly reduced in recent years. Twenty years ago, except for regions blessed with more than average sunshine, the prevalence of clinically detectable rickets in infants was estimated by Hess²⁴ at about 75 per cent. Present figures indicate that the prevalence of active and healed clinical rickets is approximately 20 per cent of children of preschool age. This figure varies greatly from community to community, depending on urbanization, age, season of the year, race and the practice of preventive treatment.²⁵ In Newark, N. J., Levy and Silver²⁶ studied, in the spring of 1937, 100 consecutive infants less than 9 months of age and

TABLE 4.—Special Examinations for Detection of Malnutrition

Examination	Condition It May Detect
Röntgenogram of hand and wrist, elbow and hip	Rickets and scurvy in children; osteomalacia and scurvy in adults
Röntgenogram of heart	Advanced beriberi
Electrocardiogram	Changes suggestive of thiamine deficiency
Biomicroscopic eye examination with slit lamp	Capillary invasion of cornea (riboflavin deficiency); changes in conjunctivas (vitamin A deficiency)
Red blood cell count	Iron deficiency anemia; Addisonian anemia; microcytic anemia
Hemoglobin	
Stained blood smear	
Red blood cell volume	Vitamin C undersaturation
Plasma ascorbic acid	
Serum calcium	Vitamin D deficiency
Serum phosphatase	
Serum phosphorus	
Blood pyruvic acid	Vitamin B ₁ deficiency
Serum protein or albumin	Protein deficiency
Blood prothrombin	Vitamin K deficiency

scurvy, rickets and ophthalmia, (2) the gross manifestations as listed in table 2 and (3) the subgross manifestations determined by special technic as listed in table 3. The procedures recommended in table 3 involve no equipment or chemicals not available in any well equipped hospital or clinic.²³

These special procedures are mostly for the detection of subgross anatomic manifestations. Only deficiency of protein, vitamin K and vitamin C may be detected by blood examination prior to development of anatomic lesions. Thiamine, nicotinic acid and vitamin A deficiency may be suspected on the basis of functional disturbances or chemical evidence, but a diagnosis cannot be made on the basis of such evidence alone. It is only by discovery of characteristic anatomic lesions that a diagnosis of rickets, osteomalacia or deficiency of iron, vitamin A, thiamine, riboflavin or nicotinic acid can be made. In some of these, biochemical changes are known to be present; but at the present time a diagnosis cannot with safety be based on chemical evidence alone. However, just as the development of special technics has led to earlier diagnosis of preg-

23. Certain tests have been omitted from this list for various reasons. Thus, methods for measuring the biophotometer and the adaptometer, although the hands of competent observers²³ and with subjective responses, are dependent on A, riboflavin and thiamine are not included. The same applies to their interpretation seen in and nicotinic acid. to urinary excretion studies.

24. Hess, A. F.: Rickets Including Osteomalacia and Tetany, Philadelphia, Lea & Febiger, 1929.

25. Youmans, J. B.: Nutritional Deficiencies, Philadelphia, J. B. Lippincott Company, 1941.

26. Levy, Julius, and Silver, H. B.: Can Rickets Be Eliminated from a Large City? Arch. Pediat. 56: 96 (Feb.) 1939.

found clinical evidence of rickets in 37 per cent. In North Dakota the state health department²⁷ reported in 1937 a study of 5,227 preschool children in whom by clinical methods active or healed rickets was found in approximately 20 per cent. In 1941 Rhoads and her co-workers²⁸ reported a study of 233 children at 2 years of age who had received 110 to 1,500 international units of vitamin D daily for the previous twenty-two months of life; active rickets was found in 7.7 per cent and healed rickets in an additional 6 per cent.

VITAMIN A DEFICIENCY

Reliable methods for the detection of early signs of vitamin A deficiency have not been available. However, Kruse²⁹ has recently shown that xerosis conjunctivae is a lesion which responds to the oral administration of large amounts of vitamin A. Wiehl and Kruse³⁰ then showed that 86.6 per cent of 494 pupils in a public school group and all but 1 of 143

The prevalence of these changes is greater among Negroes than among white persons, in male than in female, and in old than in young patients. If it is eventually confirmed that these or a portion of these changes in the conjunctivas are due to vitamin A deficiency it will be probable that the prevalence of this deficiency is many times that heretofore believed.

RIBOFLAVIN DEFICIENCY

Though ariboflavinosis is probably the most prevalent of the gross anatomic manifestations of B complex deficiencies³² there are practically no medical surveys to indicate its frequency in the general population except the one recently reported by Wiehl and Kruse.³⁰ In this study evidence of riboflavin deficiency, in the form of characteristic vascular invasion of the cornea, was found in 2.3 per cent of the private school group, 75.8 per cent of the public school group and 38.4 per cent of the WPA personnel.

TABLE 5.—Prevalence of Ascorbic Acid Depletion

Place	Subjects—Vitamin C	Criteria	Percentage Deficient	Reference
			Autumn Spring	
Maine	86 school children.....	<0.6 mg. per 100 cc. serum ascorbic acid <0.4 mg. per 100 cc. serum ascorbic acid	69 85 46 63	Crane and Woods: New England J. Med. 224:505 (March 20) 1941
Tennessee	380 "normal" children.....	<0.7 mg. per 100 cc. serum ascorbic acid	Summer Spring 45 61	Minot, Dodd, Keller and Frank: J. Pediat. 16:717 (June) 1940
Cincinnati	69 orphanage children.....	<0.5 mg. per 100 cc. serum ascorbic acid <0.25 mg. per 100 cc. serum ascorbic acid	15.9 5.8	Holmes, Cullen and Nelson: J. Pediat. 18:300 (March) 1941
New York City	(a) 342 private school children (b) 425 public school children.. (c) 165 WPA employees.....	<0.6 mg. per 100 cc. serum ascorbic acid <0.4 mg. per 100 cc. serum ascorbic acid <0.6 mg. per 100 cc. serum ascorbic acid <0.4 mg. per 100 cc. serum ascorbic acid <0.6 mg. per 100 cc. serum ascorbic acid <0.4 mg. per 100 cc. serum ascorbic acid	(a) 5.5 2.9 (b) 49.9 32.0 (c) 55.2 39.4	Wiehl: Milbank Memorial Fund Quart. 19:45 (Jan.) 1941 Wiehl and Kruse ³⁰ Wiehl and Kruse ³⁰
Washington Montana Oregon Utah Massachusetts Rhode Island	College students..... College students College students College students College students College students	<20 mg. daily urine ascorbic acid excretion	30-35	Fincke: J. Am. Dietet. A. 16:325 (April) 1940
Tennessee	900 rural population.....	(None given).....	70 65 ±20	Youmans: Am. J. Pub. Health 31:704 (July) 1941
North Carolina	218 persons, rural mill community	0 mg. per 100 cc. serum ascorbic acid.... <0.3 mg. per 100 cc. serum ascorbic acid	27 61	Milam and Wilkins: Am. J. Trop. Med. 21:487 (May) 1941
California	70 hospital patients (surgical)	<0.5 mg. per 100 cc. serum ascorbic acid <0.3 mg. per 100 cc. serum ascorbic acid <0.15 mg. per 100 cc. serum ascorbic acid	77.1 56.9 12.9	Holman: Surg., Gynec. & Obst. 70:261 (Feb. 15) 1940
New York City	100 hospital patients (medical)	<0.7 mg. per 100 cc. serum ascorbic acid	33	Scott and Janeway: New York State J. Med. 40:440 (March 15) 1940
Chicago	100 hospital patients (unspecified)	<0.4 mg. per 100 cc. serum ascorbic acid <0.3 mg. per 100 cc. serum ascorbic acid <0.2 mg. per 100 cc. serum ascorbic acid	38 19 3	Croft and Snori: Am. J. M. Sc. 198:403 (Sept.) 1939
New York City	157 hospital patients (medical)	<0.4 mg. per 100 cc. serum ascorbic acid	42	Jolliffe ³¹

WPA employees had some degree of xerosis conjunctivae. In 7.7 per cent of the public school group and in 45.5 per cent of the WPA group the xerosis conjunctivae was sufficiently advanced to form what the authors diagnosed as Bitot's spots, a condition long suspected as due to vitamin A deficiency.

In the wards of the Psychiatric Division of Bellevue Hospital, xerosis conjunctivae of a degree sufficient to form conjunctival elevations detectable with the unaided eye occurs in about 60 per cent of all patients.³¹

27. Orr, August: North Dakota State Health Department, cited by Woutat, P. H.: Journal-Lancet 58:493 (Nov.) 1938.

28. Rhoads, Teresa F.; Rapoport, Milton; Kennedy, Ruth, and Stokes, Joseph, Jr.: Studies on Growth and Development of Male Children Receiving Evaporated Milk: Effects of Various Vitamin Supplements on Growth and the Incidence of Rickets, J. Pediat. 19:169 (Aug.) 1941.

29. Kruse, H. D.: Medical Evaluation of Nutritional Status: IV. The Ocular Manifestations of Avitaminosis A, with Especial Consideration of the Detection of Early Changes by Biomicroscopy, Pub. Health Rep. 56:1301 (July 27) 1941; Milbank Memorial Fund Quart. 19:207 (July) 1941.

30. Wiehl, D. G., and Kruse, H. D.: Prevalence of Deficiency Disease in Subclinical Stages, Milbank Memorial Fund Quart. 19:241 (July) 1941.

31. Jolliffe, Norman: Chapter on Nutrition and the Deficiency Diseases in Preventive Medicine in Modern Practice, New York, Harper & Brothers, to be published.

VITAMIN C UNDERSATURATION

Now that reliable methods are available for the determination of ascorbic acid in the blood, reports of the prevalence of vitamin C undersaturation in population groups are beginning to appear. This test represents the link of tissue depletion (as reflected in the blood) in the chain of events constituting nutritional failure and precedes the development of spongy gums and periosteal and subcutaneous hemorrhages by a considerable period of time. Just as a fasting blood sugar of 130 mg. per hundred cubic centimeters may not necessarily indicate the existence of diabetes mellitus, so the presence of fasting blood ascorbic acid level below 0.4 mg. per hundred cubic centimeters does not indicate scurvy, but both do indicate the necessity for dietary readjustment.

32. Spies, T. D.; Vilter, R. W., and Ashe, W. F.: Pellagra, Beriberi and Riboflavin Deficiency in Human Beings: Diagnosis and Treatment J. A. M. A. 113:931 (Sept. 2) 1939. Sydenstricker, V. P.: The Clinical Manifestations of Nicotinic Acid and Riboflavin Deficiency (Pellagra), Ann. Int. Med. 14:1499 (March) 1941. Sebrell, J. Jolliffe.³¹

Williams and Wilder³³ have pointed out "that the normal organism in the basal state has remarkably constant levels of the various constituents of the blood, and that these levels are maintained until there is considerable depletion of stores or until there is disturbance of metabolism. Low levels of vitamins in the blood, therefore, may be evidences of severe rather than mild depletion of stores." As shown in table 5 there is evidence of vitamin C depletion (below 0.6 mg. per hundred cubic centimeters) in a large proportion of our population, ranging from 5.5 to 85 per cent of different groups.

Another method of study showing that the nutritional status of an important population group can be distinctly improved is that employed by Ebbs, Tisdall and Scott.³⁴ Exact records were taken of the food intake of women four months pregnant attending the antepartum clinic at Toronto General Hospital. The records were analyzed by the dietetic staff and a group was selected that had been consuming a poor diet containing approximately 1,600 to 1,900 calories, 60 Gm. of protein, 500 mg. of calcium and 10 mg. of iron. This group was then divided into two parts. No change was made in the diet of the first. Those in the second were furnished each day, as a supplement, one egg, 30 ounces of milk, ½ ounce of wheat germ, 1 ounce of cheese, 4½ ounces of canned tomatoes and one orange. This dietary improvement increased their calories to about 2,600, protein to 100 Gm., calcium to 1,600 mg. and iron to 24 mg. a day, besides materially raising the vitamin intake. The results are summarized in table 6. It should be noted that the "ratings" were made by an obstetric staff who did not know the dietary history of the patients. Even though, to be conservative, one might question the entire accuracy of these ratings, it is evident that a large number of these women and their children were materially benefited by

Some types of malnutrition are strikingly obvious to every one, some are apparent only to the physician who looks for them and some are vague and elusive even to the careful observer using the most accurate specialized technics. If the first group alone is counted the prevalence of malnutrition will be recorded as low, almost negligible. If the second group is counted it will be recorded as high. If the third group is included then the rate will be sufficiently high to occasion genuine concern.

The evidence at our disposal warrants the conclusion that dietary inadequacies and malnutrition of varying degrees are of frequent occurrence in the United States and that the nutritional status of an appreciable part of the population can be distinctly improved. If optimal nutrition is sought, not mere adequacy, then widespread improvement is possible.

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THE INFLUENCE OF SULFONAMIDE THERAPY ON POSTPNEUMONIC EMPYEMA THORACIS

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The dramatic beneficial effects of the sulfonamide derivatives in the treatment of pneumonia has naturally invited investigations concerning the effects of these drugs on empyema thoracis. There was even some hope that chemotherapy might largely eliminate the necessity of surgical intervention in cases of empyema by causing the disappearance of pus resulting from infections by organisms vulnerable to the sulfonamide derivatives. There is now, however, sufficient experience with post-pneumonic empyemas in patients who had received adequate chemotherapy during the course of the pneumonia to state categorically that, once empyema thoracis (an abscess in the pleura) is present, adequate drainage of the abscess is essential. It becomes apparent, therefore, that the introduction of the sulfonamide derivatives has not altered in any way the fundamental principles of the management of empyema which were outlined by Graham and Bell¹ during the first world war. To add to the voluminous and exhaustive literature on the subject of empyema thoracis would hardly be justified were it not for the fact that sulfonamide therapy has so altered certain features of the clinical picture of empyema that it seems well to review our experiences with the disease since its use in the treatment of the pneumonias has become universal.

There is a large volume of literature treating many phases of the incidence and variables of postpneumonic empyema before the introduction of sulfanilamide, sulfapyridine and sulfathiazole. Howard² compiled some of the large reported series and found that empyema developed in 739 cases out of 24,730 cases of pneumonia, an incidence of approximately 3 per cent. Heffron,³

TABLE 6.—Effects of a Poor and a Good Diet in 210 Pregnancies

	Poor Diet	Supplemented Diet
Number of women.....	120	90
Obstetric antepartum rating "poor" or "bad".....	36%	0%
".....".....	47%	17%
".....".....	9.4%	0
Condition during labor rated "poor" or "bad".....	20.3 hrs.	15.2 hrs.
Condition during convalescence rated "poor" or "bad".....	21%	3%
Final rating by obstetrician of whole course from fourth month through convalescence, "poor time" or "bad time".....	12%	4%
Complication of mother during 6 months post delivery.....	34%	6%
Babies have.....	46%	10%
Number of.....	14%	0
.....	3%	0

improvement in the diet and therefore that previously they had suffered in greater or less degree from nutritional failure. The results of these studies are important in indicating the prevalence of suboptimal nutrition in a population group—pregnant women—whose health is of special importance. They are even more significant, however, in demonstrating what may be achieved by better nutrition.

SUMMARY AND CONCLUSIONS

Malnutrition is accompanied by manifold signs and symptoms, diverse in nature, and to the casual observer their origin and significance are not always apparent.

33. Williams, R. D., and Wilder, R. M.: The Prevalence of Malnutrition in the American Population: A Review of the Evidence, National Research Council Report, 1941.

34. Ebbs, J. H., Tisdall, F. F., and Scott, W. H.: Influence of Prenatal Diet on the Mother and Child, J. Nutrition 22: 515 (Nov.) 1941.

From the Department of Surgery, Washington University, and the Medical and Surgical Chest Service of the Barnes Hospital.
1. Graham, E. A., and Bell, R. D.: Am. J. M. Sc. 150: 839, 1918.
2. Howard, E. P.: The Diagnosis and Treatment of Pneumonia, New York, Oxford University Press, 1931, p. 373.
3. Heffron, Roderick: Pneumonia, New York, Oxford University Press, 1939, p. 1086.

in a compilation of 3,709 patients with pneumococcic pneumonia, most of whom were adults, found that empyema developed in 182, or 4.9 per cent. This author further analyzed the influence of the pneumococcic types on the incidence of empyema. Of 2,528 type I cases, empyema developed in 161, or 6.4 per cent. In 1,570 type II cases there was an incidence of 4 per cent. In 386 type III cases there were 17 cases of empyema, an incidence of 4.4 per cent. In group IV (old classification) there were 909 cases of pneumonia with 45 cases of empyema, or 5 per cent. Webster⁴ has pointed out that yearly variations in the incidence of empyema can be correlated with similar yearly variations in type incidence. This variation likewise has been pointed out by Heuer.⁵ Patterson⁶ has found a definite seasonal variation in the incidence of empyema as a complication of pneumonia. That empyema occurs more frequently in the pneumococcic pneumonias of childhood is common knowledge. An incidence as high as 37.8 per cent has been reported by Lyon⁷ in a series of type I pneumococcic childhood pneumonias. This is unusually high, of course. McCrae⁸ and Heuer⁵ agree that the severity of the pneumonia directly influences the incidence of empyema. The correlation between the virulence of the prevalent organism and the resulting empyema has been stressed by Graham and Berck.⁹ Harloe,¹⁰ analyzing 351 cases, found that the empyema was massive or generalized in 76.9 per cent, sacculated or interlobar in 18.6 per cent and bilocular in 2.3 per cent. It was bilateral in 2.3 per cent of the cases.

The dramatic results obtained in the therapy of the pneumonias with the sulfonamide compounds have led quite naturally to their universal use in these infections. While no such large series as cited in the presulfonamide era exists for comparative studies, the reported cases show a striking reduction in the incidence of empyema when the pneumonia has been treated with one of the therapeutically active sulfonamides. Hurwitz and Stephens¹¹ report an incidence of 0.9 per cent in 629 cases of pneumonia occurring in children. Schwartz and his collaborators¹² found an incidence of 2.3 per cent, and Flippin and his associates¹³ found 5 cases out of 200. Wagoner and Hunting¹⁴ saw only 1 case of empyema develop in 109 cases of pneumonia in infancy and childhood. Of these 55 developed in the sulfapyridine group. Carey,¹⁵ in an analysis of 613 cases of pneumonia in children, found 20 cases of empyema. All of these 20 patients had pleural fluid when admitted to the hospital. In no instance did empyema develop after the institution of chemotherapy if fluid did not previously exist. Scott and Jones¹⁶ saw empyema develop only once in 167 cases. Garvin,¹⁷ in 40 cases of pneumococcic pneumonia treated with sulfa-

thiazole, had but one complicating empyema, and in 62 cases treated with 'sulfapyridine saw only 4 cases. Thompson, Edwards and Hoagland¹⁸ made comparative studies on the value of serum, sulfapyridine and the two combined during the winter of 1938-1939 in the St. Louis area. In a series of 121 cases of pneumococcic pneumonia treated with rabbit serum alone there were 12 cases of empyema. In another group of 142 cases treated with sulfapyridine alone there were only 4 cases. These same workers¹⁹ had an opportunity to continue their studies on the 1939-1940 St. Louis series and present the striking fact that in 275 cases in which recovery occurred there was not a single case of empyema. Of these, 182 were treated with sulfapyridine alone.

Lanman and Heyl²⁰ were skeptical of the use of sulfonamides in empyema after pus had formed. These authors were impressed by the apparent change in the character of the exudate in the few cases they observed; they thought the pus was thicker and more tenacious.

Thus far the reports on the sulfonamide therapy of the pneumonias have been extremely vague for the most part, and in all instances very brief in their discussion of the complications. This is true with reference to the empyemas. It is difficult to get an accurate idea of the incidence of pleural complications and of their nature. Frequently pleural effusions have been mentioned with no further reference to their fate.

Before the introduction of sulfonamide therapy the clinical course of postpneumococcic empyema thoracis was in most instances very typical. Following the crisis of the pulmonary process there was an afebrile period of varying length followed by a sharp rise in temperature, which led to the discovery of an effusion. After a short time the effusion became frankly purulent and some form of drainage was instituted. If this was done promptly and adequately there was an immediate drop in temperature, the patient began to improve rapidly, and obliteration of the empyema pocket was complete in three to five weeks in almost all cases. The failure to obliterate pockets rapidly was unusual, and the necessity for secondary drainage operations was most infrequent.

To date we have had the opportunity to observe 30 cases of postpneumonic empyema which had been treated from the beginning of the illness with one of the sulfonamides. A considerably larger number have been treated, but on the remainder satisfactory data are lacking concerning the type and amount of drug administered. These cases occurred during the seasons of 1938-1939, 1939-1940 and 1940-1941. All ages are represented in the series. In all of the cases surgical drainage was instituted as soon as frank pus was obtained by thoracentesis. Patients in whom drainage had been delayed are not included because any peculiarity of localization of the empyema might result from the delay in evacuation of the pus.

The transition from effusion to frank pus was prolonged in the cases in which sulfonamide therapy was employed.

For comparative purposes a similar series of 29 cases of postpneumonic empyema not treated with any of the

4. Webster, R.: *M. J. Australia* 1:129, 1924.
5. Heuer, George J.: *J. Thoracic Surg.* 1:461, 1932.
6. Patterson, S. W.: *M. J. Australia* 2:115, 1922.
7. Lyon, A. B.: *Bacteriologic Studies of 165 Cases of Pneumonia and Postpneumonic Empyema in Infants and Children*, *Am. J. Dis. Child.* 23:72 (Jan.) 1922.
8. McCrae, Thomas: *Bull. Johns Hopkins Hosp.* 15:277, 1910.
9. Graham, E. A., and Berck, Maurice: *Ann. Surg.* 98:520, 1933.
10. Harloe, R. F.: *Am. J. Surg.* 26:231, 1934.
11. Hurwitz, Samuel, and Stephens, H. Brodie: *J. Pediat.* 14:11, 1939.
12. Schwartz, Louis; Flippin, H. F.; Turnbull, W. G., et al: *Ann. Int. Med.* 13:1000, 1939.
13. Flippin, H. F.; Schwartz, Louis; Rose, S. B., and others: *Ann. Int. Med.* 13:2038, 1940.
14. Wagoner, Stewart C., and Hunting, William F.: *Sulfathiazole and Sulfapyridine*, *J. A. M. A.* 116:267 (Jan. 25) 1941.
15. Carey, Benjamin W.: *J. Pediat.* 18:133, 1941.
16. Scott, John P., and Jones, Albert M.: *J. Pediat.* 17:423, 1940.
17. Garvin, Curtis F.: *Comparison of Sulfathiazole and Sulfapyridine in Treatment of Pneumococcic Pneumonia*, *Arch. Int. Med.* 66:1246 (Dec.) 1940.
18. Thompson, Lawrence D.; Edwards, Joseph C., and Hoagland, C. L.: *Ann. Int. Med.* 13:1138, 1940.
19. Thompson, Lawrence D.; Terry, Luther L., and Edwards, Joseph C.: *J. Missouri M. A.* 37:463, 1940.
20. Lanman, Thomas H., and Heyl, Henry H.: *New England J. Med.* 221:1003, 1939.

sulfonamides has been collected from our cases. This series likewise represents all age groups, and the cases have been taken in order without selection so that the two groups are comparable for statistical purposes. In the 29 cases of empyema reviewed here which were not treated by any of the sulfonamides all were general in type except 1, which was interlobar. Prompt recovery occurred in all, and in no instance was there any delay in obliteration of the pocket. In no instance was a secondary drainage operation required. In this group there were 23 pneumococcic cases, 7 type I, 9 group IV, 1 type III and 6 not typed. There were 5 hemolytic streptococcus cases, and in 1 case no growth was obtained.

In the sulfonamide treated group of 30 cases all ages are represented. Of the 30 cases 13 were treated with sulfapyridine, 10 with sulfathiazole, 3 with sulfanilamide, 1 with sulfamethylthiazole, 2 with sulfapyridine and sulfathiazole, and 1 with sulfathiazole and serum. Four cases were interlobar in type, 3 were encapsulated, 2 were posterior in type with an associated independent interlobar pockets and 1 was a small, encapsulated pocket in the vertebral gutter. In 9 of the cases there was marked delay in the reexpansion of the lung, and in 2 cases it was necessary to do secondary drainage operations. There were two deaths in this group, one due to a toxic hepatitis from sulfathiazole and one due to brain abscess. There were 25 pneumococcic cases, of which 11 were type I, 2 type III, 2 group IV (1 type V and 1 type XIX) and 10 not typed. There were 3 hemolytic streptococcus cases and 2 hemolytic staphylococcus cases.

While it is true that a relatively small series such as this represents does not warrant drawing too sweeping conclusions, yet the differences in the cases treated with sulfonamides are so striking as to be noteworthy. Furthermore, these differences are much more apparent to the experienced observer who actually follows the individual case than can be delineated by tables, graphs or descriptions. There is no denying the vast prognostic difference that sulfonamide therapy has wrought in the pneumococcic and streptococcic pneumonias. Neither is there any doubt that the treatment of the pneumonias with these agents has brought about a decided reduction in the incidence of complications, particularly empyema. From a presulfonamide incidence of approximately 5 per cent²¹ the figure has been reduced to 1 per cent or less.²² However, it is our belief that the picture of postpneumonic empyema has become so atypical and bizarre since the universal use of sulfonamide therapy in the pneumonias as to make a reevaluation of the disease necessary if we are to avoid committing grave errors in its treatment.

A consideration of the data presented demonstrates clearly the increased number of cases in which atypical empyema pockets occur. There is a much higher incidence of interlobar empyemas and a greater tendency to form either isolated or multiple encapsulated pockets which are difficult both of visualization and of adequate drainage. The number of cases in which reexpansion of the lung and obliteration of the pocket are delayed is disturbingly greater. Likewise the required number of thoracostomies for drainage in the individual case has increased.

It is our belief that once the pneumonia has been adequately controlled, and certainly when pus has been demonstrated in the pleural cavity, sulfonamide therapy should be discontinued. To treat the empyema, once it has developed, chemotherapeutically is not only irrational but may be definitely deleterious. Such a course will only obscure the picture and render the proper surgical procedure more difficult. The idea, unfortunately too common among pediatricians and internists, that a purulent pleurisy caused by organisms affected by the sulfonamide drugs once formed will often take care of itself if chemotherapy is continued is just as fallacious as assuming that any other abscess will do the same without proper surgical drainage.

Two of the most valuable clinical guideposts in the proper treatment of empyema are the fever curve and the patient's appetite. In the case in which drainage has been adequate the temperature returns quite promptly to normal and the appetite becomes good and even voracious. Conversely, when for one reason or another the drainage becomes inadequate there is a prompt rise in temperature and an associated anorexia. The sulfonamides are notorious for their antipyretic properties and for their anorexic effects. The patient with a drained empyema who is being treated by one of these drugs often provides a confusing dilemma. One is lulled into a false sense of security by the antipyretic effect of the drug on the one hand and alarmed by its appetite destroying properties on the other.

It is to be hoped that, in the future, students of pneumonia will report their cases with more accurate data concerning the incidence and fate of the pleural complication.

Further studies on this problem are indicated so that the treatment of the pleural complications may remain rational. At present there is a real danger that the boon of sulfonamide therapy in the pneumonic patient may become a boomerang in the form of ill advised treatment of empyema.

SUMMARY AND CONCLUSIONS

1. A series of 30 cases of postpneumonic empyema thoracis occurring during or after sulfonamide treated pneumonias, together with a series of 29 cases which occurred in pneumonias not treated by any of the sulfonamide drugs, was studied.
2. A review of the literature makes apparent the reduction in the incidence of this complication since the introduction of sulfonamide therapy in the pneumonias.
3. Although the incidence is much less, we believe that the empyema when it does occur is very apt to be atypical and more difficult to treat satisfactorily. Though small, this series demonstrates differences far greater than can be explained by the many variables presented by the disease uninfluenced by sulfonamide therapy. There is a decided tendency to peculiar pocket formation with delayed reexpansion of the lung and obliteration of the empyema pocket. The number of secondary drainage operations is increased.
4. We feel that, once the pulmonary process is under control and pus has formed in the pleural space, sulfonamides should be discontinued.
5. Other series should be studied and reported in order that the therapy of the postpneumonic empyemas may remain rational and effective.

21. Howard.⁸ Heffron.²
22. Footnotes 11-19.

CHEMOTHERAPY IN THE MANAGEMENT OF LUDWIG'S ANGINA

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The condition now known as Ludwig's angina has interested surgeons for centuries. The frequency with which it is encountered depends to some extent on the definition of the entity one accepts. Most cases follow the extraction of a lower molar tooth. Hemolytic streptococci appear to be the most prevalent etiologic agents. Because of swelling of the buccal contents, respiratory embarrassment is a common complication which at times may be severe enough to require tracheotomy. Mediastinitis and septicemia have also been noted.

The temperature in this condition varies widely and is not an indication of the severity of the process. Aside from the systemic symptoms which depend on the stage of the process and the presence or absence of those complications noted elsewhere, the clinical appearance is largely determined by swelling of the buccal contents. A hard, boardlike swelling externally may be limited at first to one side of the neck, corresponding to the location of the disease inside the mouth. This swelling usually extends to involve the neck in dog collar fashion. It is not fluctuant until late in the disease, since it is deep to the deep cervical fascia. The leukocyte count is usually moderately elevated.

Ludwig's angina should be differentiated from infections in the neck which are superficial to the deep cervical fascia and the mylohyoid diaphragm and from inflammatory processes intimately related to the lymphatics.

Treatment, as usually suggested, consists in wide incision and drainage. The use of sulfanilamide as an adjunct to surgical therapy has been suggested. A few cases have been reported recording recoveries after treatment with sulfanilamide in unmentioned dosage.

Mortality rates vary from 5 to 75 per cent, apparently mainly because different surgeons call different conditions Ludwig's angina. In Ludwig's 5 cases the mortality rate was 60 per cent.

CASES

I report 3 cases which seem to me properly to fall within the classification of Ludwig's angina. The report seems warranted because it was possible with the use of the sulfonamide drugs, particularly sulfathiazole, to bring about recovery without the aid of active surgical intervention. So far as I can determine, this has not previously been reported although, doubtless, other patients have been so treated.

CASE 1.—A white woman aged 32, admitted Jan. 6, 1941, had consulted a dentist because of an aching lower left second molar seven days previously. The tooth was extracted. Four days before admission the left side of the neck began to swell. Pain was not noted but the tumor was tender. At this time she complained of gradually increasing difficulty in opening her mouth, and swallowing became impossible. One day before admission the swelling extended across the midline anteriorly to the right side of the neck, and she felt feverish for the first time.

The patient was obese (192 pounds [87.1 Kg.], 5 feet 8½ inches [174 cm.]). On examination she did not appear acutely

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ill. There was no difficulty with respiration. The temperature by mouth was recorded as 102 F. The pulse was 104 beats a minute. Respirations averaged 24 a minute. The blood pressure was 150 systolic and 100 diastolic. The mouth could be opened 20 per cent of the normal range. The tongue was swollen and elevated and was protruding slightly. The bed of the left lower second molar was covered with a gray membrane which extended over the left side of the floor of the mouth. The floor of the mouth was greatly swollen, more on the left side than on the right side. Her breath was foul. There was a brawny, moderately tender swelling 8 cm. in diameter centering under the chin. Urinalysis showed the presence of albumin, graded 3 on the basis of 1 to 4, a few hyaline casts and a few cylindroids. The value for hemoglobin was not accurately determined and there were 4,680,000 erythrocytes and 15,000 leukocytes per cubic millimeter of blood. The differential blood smear revealed 8 per cent lymphocytes, 1 per cent monocytes, 1 per cent eosinophils and 90 per cent polymorphonuclears. The Kahn test for the presence of syphilis was negative. Staphylococci were cultured from material taken from the membrane covering the floor of the mouth.

Continuous moist warm dressings were applied to the neck and continuous steam inhalations were begun. A tracheotomy set was held in readiness. Fluids were supplied intravenously.

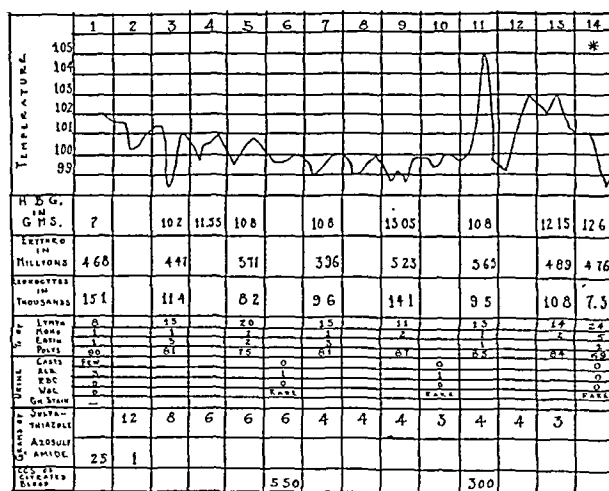


Chart 1.—Clinical course in case 1; * indicates that in the next four days the highest temperature was 99 F. and the patient was dismissed.

Five intramuscular injections of 5 cc. of 5 per cent azosulfamide were given in the first twenty-four hours. Sulfathiazole 120 grains (8 Gm.) was given rectally soon after admission, and within the next thirty-six hours an additional 120 grains of sulfathiazole was given by the same route in 60 grain (4 Gm.) doses.

The following day the patient could swallow and began to take fluid by mouth. She was given 15 grains (1 Gm.) of sulfathiazole every four hours. On January 9—three days after admission—she was able to take a soft diet. The swelling had decreased to about 75 per cent of its initial size. Reference to chart 1 will show that in four days the erythrocyte level fell about one million cells. Albumin and casts were disappearing from the urine and finally the urine became completely clear. She was given two transfusions, after the second of which she had a chill with a rise in temperature to 105 F. It is of interest that this patient's blood type IV failed to cross match with that of several type IV donors after she had been taking sulfathiazole for some time. By January 18 there remained but little swelling and the mouth could be opened normally; the temperature, however, was recorded as 103.8 F. by rectum. At this time a total of 64.3 Gm. (965 grains) of sulfathiazole had been given over a period of twelve days—an average of 5.36 Gm., or 80.4 grains, daily. Medication was discontinued and in twenty-four hours the temperature dropped to normal and in the next four days did not rise above 99 F.

by rectum. The swelling had disappeared; the site of extraction of the left lower molar had completely healed and urinalysis was entirely negative. She was dismissed from the hospital, and subsequent check-up examinations have revealed no recurrence of the condition.

CASE 2.—A white man aged 58, admitted Feb. 5, 1941, had two days previously had the lower right lateral incisor extracted

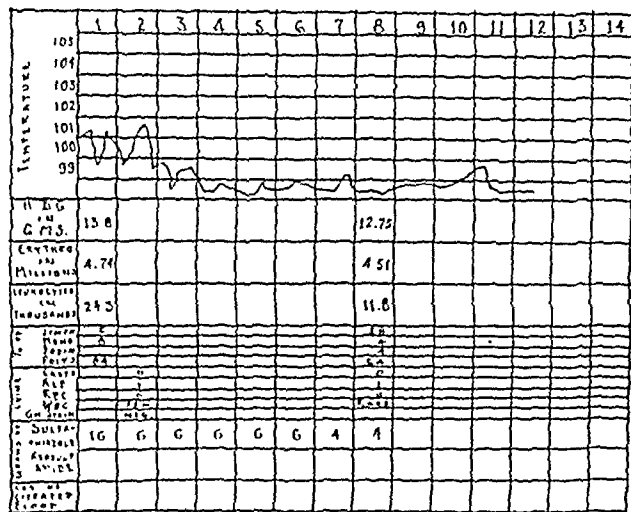


Chart 2.—Clinical course in case 2.

because of pain. One day before admission his neck began to swell on the right side and became painful. These symptoms increased, and on admission he was unable to swallow or expectorate, although he had no difficulty with respiration.

On examination the patient was well developed and well nourished and did not appear acutely ill. There was no difficulty with respiration. The temperature by mouth was recorded as 101 F., the pulse was 90 beats a minute and respirations averaged 22 a minute. The blood pressure was 140 systolic and 65 diastolic. The mouth could be opened quite widely. The tongue was swollen and elevated (grade 1 plus on the basis of 1 to 4). The bed of the right lower lateral incisor was edematous. The floor of the mouth was swollen (grade 1). There was a tender (grade 3) indurated swelling measuring about 8 cm. in diameter centering in the right submaxillary region. It was moderately firm, but one could not tell too much about this because of extreme tenderness. All remaining teeth were carious and very dirty. Gingival infection was extreme.

Urinalysis showed the presence of albumin (grade 1) and 3 to 4 plus cells per high power field in the centrifuged sediment. Gram stain of the sediment showed no organisms. The level of hemoglobin was 13.8 Gm. per hundred cubic centimeters of blood. There were 4,740,000 erythrocytes and 24,300 leukocytes per cubic millimeter of blood. The differential blood smear revealed 6 per cent lymphocytes, 8 per cent monocytes and 86 per cent polymorphonuclears. The Kahn test was not done. No material for culture was taken from the floor of the mouth.

The usual moist warm dressings and parenteral fluids were supplied. Mouth washes were used frequently. Owing to his inability to swallow, sulfathiazole was administered by rectum at first; 120 grains was given by this route at first, and this dose was repeated in twelve hours. The following day, February 6, the swelling had decreased slightly. The peak temperature was 101.6 F. by mouth. The patient was given 15 grains of sulfathiazole every four hours. By February 8, three days after admission, the temperature was normal (chart 2). On February 11, six days after admission, only a small firm area remained. The dosage of sulfathiazole was reduced to 60 grains daily. Reference to chart 2 will show that on February 12 the value for hemoglobin was 12.75 Gm. per hundred cubic centimeters of blood. There were 4,510,000 erythrocytes and 11,800 leukocytes per cubic millimeter of blood. The differential blood smear revealed 28 per cent lymphocytes, 4 per cent monocytes, 4 per cent eosinophils and 64 per cent poly-

morphonuclears. The urine showed a faint trace of albumin and a very occasional pus cell. The swelling was nearly gone on February 13. Sulfathiazole was discontinued. At this time the patient had taken, in eight days, 810 grains, or 54 Gm., of sulfathiazole, an average of 101.2 grains (6.75 Gm.) of the drug daily. During this time the fluid intake was never less than 2,500 cc. By February 15, ten days after admission, the swelling and soreness had disappeared completely. The patient was dismissed.

CASE 3.—A white boy aged 18 months was admitted Feb. 2, 1941. Two weeks previously his mother had noted sores on his lips which did not respond satisfactorily to various ointments. Two days before admission a swelling appeared in the right submaxillary and submental regions. The floor of the mouth became swollen. Trismus appeared and swallowing became impossible (this was a transient symptom). The family physician found the axillary temperature to be 103 F. and advised hospitalization.

On examination the patient appeared moderately ill. He was somewhat irritable. There was no difficulty with respiration. The rectal temperature was recorded as 104.2 F. The lower jaw could be moved through about three quarters of its normal range. The floor of the mouth was elevated (grade 1 plus) on the right. The tongue was not noticeably swollen. The throat appeared normal. The lips were dry and showed superficial encrusted lesions. A hard, moderately tender (grade 1 plus) swelling was present in the right submaxillary and submental areas. Urinalysis showed the presence of albumin (grade 1) and an occasional pus cell. The value for hemoglobin was 12.3 Gm. per hundred cubic centimeters of blood. There were 4,360,000 erythrocytes and 36,400 leukocytes per cubic millimeter of blood. The differential blood smear revealed 22 per cent lymphocytes, 5 per cent monocytes and 73 per cent polymorphonuclears. The Kahn test was not done. Culture of material swabbed from the floor of the mouth revealed hemolytic *Staphylococcus aureus*.

The general measures used in the previous 2 cases were employed. In the first thirty-six hours 30 cc. of 5 per cent azosulfamide was given intramuscularly, after which time the medication was changed. On February 4 he was given two 30 grain (2 Gm.) doses of sulfathiazole by rectum. On Febru-

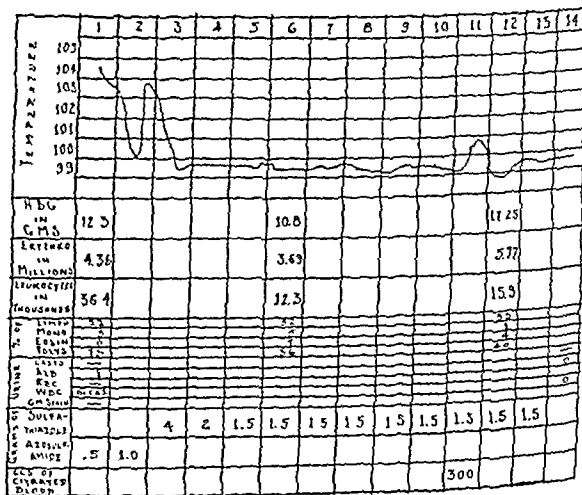


Chart 3.—Clinical course in case 3.

ary 5 he was given 30 grains of sulfathiazole by rectum. From February 6 to February 14 inclusive he received 7½ grains (0.5 Gm.) three times a day by mouth, making a total of 292½ grains (19.5 Gm.) of sulfathiazole in eleven days, an average of 26½ grains (1.77 Gm.) daily. The total dose of azosulfamide was 30 cc. of a 5 per cent solution (22½ grains equals 1.5 Gm.).

Reference to chart 3 will show that, with the exception of a transient rise in temperature to 100.8 F. rectally, on February 12, following a transfusion of 300 cc. of blood, his tempera-

ture did not deviate from the normal after the third hospital day. The child was given a transfusion because of a fall in the erythrocyte level to 3,690,000 from 4,360,000 within five days after admission. In the same length of time the leukocyte level had changed from 36,400 to 12,300 cells per cubic millimeter of blood, the blood smear at this time showing 52 per cent lymphocytes as compared with 22 per cent on admission and 36 per cent polymorphonuclears as compared with 73 per cent on admission. Urinalysis gave negative results after the course of medication was ended.

The swelling receded more slowly than in the other cases; a slight tumor remained when the child was dismissed on February 16, fourteen days after admission. The skin was freely movable over this swelling. It was not a gland and was situated deep to the mylohyoid diaphragm. The floor of the mouth was normal when the patient was dismissed. Follow-up examination, February 25, showed a barely perceptible area of induration and slight swelling where the tumor had been.

COMMENT

I do not wish to be understood as advocating the exclusive routine use of the sulfonamide drugs in the treatment of this malady regardless of the stage of disease or of the condition of the patient when he is first seen. Obviously, some will require immediate operation, either tracheotomy or wide incision or both, and preparations for such operations should always be made and held in readiness whenever a patient is admitted with a condition which may rather rapidly go on to produce respiratory embarrassment. However, in view of the experiences presented in this report, I do not see the necessity for precipitous surgery. It seems reasonable, in the absence of imperative indications for operation such as acute respiratory embarrassment or late fluctuation or continued severe constitutional disturbances, to treat these patients conservatively. I suggest that, so long as the term Ludwig's angina is apparently here to stay, when a patient presents an inflammatory process involving the floor of the mouth, deep to the mylohyoid diaphragm, as evidenced by elevation of the tongue, and producing a brawny induration of one or both submaxillary regions, with or without involvement of the submental region, which is obviously not confined within the lymphatics but bounded by tissue planes, he is to be considered as having Ludwig's angina.

Belief in the Common Man.—Democracy is a way of life controlled by a working faith in the possibilities of human nature. Belief in the common man is a familiar article in the democratic creed. That belief is without basis and significance save as it means faith in the potentialities of human nature as that nature is exhibited in every human being irrespective of race, color, sex, birth and family, of material or cultural wealth. This faith may be enacted in statutes, but it is only on paper unless it is put in force in the attitudes which human beings display to one another in all the incidents and relations of daily life. To denounce Nazism for intolerance, cruelty and stimulation of hatred amounts to fostering of insincerity if, in our personal relations to other persons, in our daily walk and conversation, we are moved by racial, color or other class prejudice; indeed, by anything save a generous belief in their possibilities as human beings and hence in the need of providing conditions which will enable these capacities to reach fulfillment. The democratic faith in human equality is belief that every human being, independent of the quantity or range of his personal endowment, has the right to equal opportunity with every other person for the development of whatever gifts he has.—Dewey, John: *Creative Democracy—The Task Before Us*, *Assn. Am. Coll. Bull.* 26:198 (May) 1940.

FEBRILE REACTIONS ACCOMPANYING THE READMINISTRATION OF SULFATHIAZOLE

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Since sulfathiazole has been utilized frequently and successfully in the treatment of various infectious diseases, information concerning its undesirable reactions is of considerable importance.

It was observed that some patients who had been given one course of sulfathiazole without any deleterious effects had fever, often preceded by chills, shortly after the start of a second course of the drug.¹ The fever appeared to be associated with the administration of the sulfathiazole rather than with the infection for which the second course of the drug was given. When the sulfathiazole was discontinued, the fever subsided.

This type of reaction occurred in 36 per cent of the patients receiving a second course of the drug and is presumably due to a hypersensitivity to sulfathiazole.

METHODS AND RESULTS

Experiments on the Frequency and Time of the Febrile Reaction.—Fifty-three afebrile patients who received one course of sulfathiazole without complications were given a second course of the drug, usually for experimental purposes. Thirty-six of these patients received the initial course of sulfathiazole for therapeutic purposes for two to eighteen days (mean five and eight-tenths days) with clinical remission of their disease. Seventeen afebrile patients with no evidence of infection were considered controls and received the initial course of sulfathiazole for two days. The second course was started from two to twenty days (mean seven and eight-tenths days) after the completion of the first course.

A course of sulfathiazole consisted of an initial dose of 4 Gm. followed by 1 Gm. every four hours. The second course was given in exactly the same manner and continued for two to seven days unless a febrile reaction occurred.

Nineteen of the 53 patients (36 per cent) developed a severe febrile reaction with the administration of a second course of sulfathiazole. Eleven of the 36 patients (31 per cent) receiving the initial course for therapeutic purposes and 8 of the 17 controls (47 per cent) had a febrile response. This reaction occurred usually on the first day of the second course and was characterized by a sharp rise in temperature to between 102 and 106 F., accompanied frequently by chills. After the drug was discontinued the temperature returned to normal in from one to five days (mean two and nine-tenths days). Associated with the reaction there were profound prostration, weakness and exhaustion, often out of proportion to the temperature elevation and the general clinical condition, which persisted for several

Work done by Dr. Balberor in partial fulfillment of the requirements for the degree of Master of Science in Medicine from Wayne University. From the Medical Clinics of the William J. Seymour Division of Eloise Hospital, and the Departments of Medicine of the University of Michigan and Wayne University.

1. Lyons, R. H., and Balberor, Harry: *Univ. Hosp. Bull., Ann Arbor* 7: 19-20 (March) 1941.

days after the fever subsided. Nausea, vomiting, delirium, stupor and conjunctivitis occasionally accompanied the pyrexia reaction. The details of the febrile reaction in these 19 cases are presented in the accompanying table.

Ten of the 19 patients experiencing a thermal response to a second course of sulfathiazole were given a third course in an attempt to reproduce the reaction. This third course was given in exactly the same manner as the preceding courses from ten to thirty-one days (mean seventeen days) after the termination of the previous febrile reaction. Eight of these 10 patients had the same type of reaction.

4 instances until between the ninth and the twelfth day after the first exposure to the drug. This was quite different from the immediate febrile reaction that was found when the second course was started ten or more days after the initial dose of sulfathiazole.

The interval between courses of the drug was prolonged to forty-one, thirty-five and thirty-three days respectively in 3 cases in which at least one febrile reaction had already been experienced. The readministration of sulfathiazole after these intervals was accompanied by a typical febrile response.

The effect of a single small dose of sulfathiazole was studied by administering doses varying from 0.25 Gm

Cases in Which Two Courses of Sulfathiazole Were Administered with a Febrile Reaction to the Second Course

Case	Reason for Sulfathiazole Administration	Duration First Course, Days	Interval Between Courses, Days	Time of Reaction After Beginning Second Course, Hours	Amount of Drug Given Before Reaction, Gm	Maximum Temperature	Chills	Days of Duration of Fever	Sulfathiazole Blood Level, Day of Reaction	Sulfathiazole Crystals in Urine	Eosinophils	Comment
S. M.	Lobar pneumonia.	10	10	6	5	102	—	5	8.0	—	..	Moderate weakness and exhaustion
S. K.	Lobar pneumonia	3	9	15	7	101	+	1	1.7	—	..	Multiple chills, exhaustion and weakness
G. S.	Thrombophlebitis with infection	9	14	3	1	101	+	5	2.3	—	0	Severe exhaustion and weakness
E. R.	Bronchiectasis ..	9	10	4	5	102	+	4	..	—	12	Diffuse maculopapular dermatitis, nausea, vomiting
M. Y.	Cellulitis of face	9	8	4	5	101	+	1	..	—	..	Mild weakness
W. W.	Bronchopneumonia	5	7	10	9	101	—	3	10.0	—	..	Severe exhaustion and weakness
N. Z.	Lobar pneumonia .	5	2	72	18	105	+	3	...	+	9	Severe exhaustion and weakness
T. G.	Pyelonephritis	4	9	4	1	101	+	2	...	..	..	Nausea, weakness and exhaustion
H. H.	Lobar pneumonia, acute epididymitis	7	10	12	7	101	—	3	3.5	—	0	Severe weakness and exhaustion
D. B.	Lobar pneumonia. . .	6	5	12	7	102.4	—	5	4.4	+	0	Severe weakness and exhaustion
G. B. D.	Lobar pneumonia.	5	4	16	8	102.4	+	1	4.3	—	2	Mild weakness
F. H.	Control	2	12	18	9	101	—	3	6.7	—	..	Nausea, vomiting, delirium, exhaustion and weakness
M. K.	Control	2	7	48	16	102	—	1	5.0	+	..	Mild weakness
F. C.	Control	2	7	18	8	101	—	4	8.0	+	1	Nausea, vomiting, severe weakness and exhaustion
J. W.	Control.	2	2	216	57	103	—	3	3.7	+	8	Nausea and vomiting; severe weakness and exhaustion
Do. B.	Control	2	2	168	45	101	—	3	4.8	+	3	Mild weakness
P. P.	Control	2	4	48	15	103	+	1	5.5	—	0	Nausea and vomiting; weakness and exhaustion
F. Z.	Control	2	2	120	25	101.6	—	4	1.9	—	2	Mild weakness
A. S.	Control	2	7	16	9	101	—	2	2.5	—	..	Mild weakness

Subsequent full courses of sulfathiazole were given in 3 selected cases: two of these are described in detail in the case reports. The first patient received eight courses of sulfathiazole and after an uneventful initial course experienced seven distinct thermal reactions. In patients who experienced multiple febrile reactions, the later reactions tended to become less severe.

In an effort to determine the minimum time before a febrile reaction would develop with a second course of sulfathiazole, 8 controls were given a two day initial course of the drug. In 4 of these the second course was started after a two day interval and continued for eight days if no reaction occurred. In the other 4 a second course was started after a four day interval and continued for six days unless a fever developed. Two persons in each group experienced a febrile reaction during the second course of the drug. The time of onset of the fever, however, was delayed in these

to 1 Gm. to 7 patients who had previously experienced at least one febrile reaction. A 0.5 Gm. dose given to each of 5 patients produced a sharp febrile response in only 1 case. A 0.25 Gm. dose given to this patient three days later was without effect. When 1 Gm. of sulfathiazole was administered to each of 7 patients a mild thermal response was produced in 3. It was observed that following the repeated administration of small doses of sulfathiazole the reaction produced by a full course of the drug was diminished in intensity.

The hospital records of 200 consecutive patients receiving sulfathiazole were examined for the frequency of fever during a single course of the drug and for the duration of the sulfathiazole therapy. Only 5 patients (2.5 per cent) had fever attributable to the drug. In none of these cases was the fever experienced prior to the seventh day. Only 48 of the 200 patients received the drug for longer than seven days. Thus the

incidence of drug fever in cases in which the drug was administered for seven days or longer was 10.4 per cent.

Experiments on the Specificity of the Febrile Reaction.—Sulfanilamide and sulfapyridine were administered to each of 5 patients who had experienced febrile reactions following the readministration of sulfathiazole. The dose in each instance was 4 Gm. initially followed by 1 Gm. every four hours and continued for two to six days. However, these drugs failed to produce febrile reactions. Subsequent administration of sulfathiazole, given after the sulfanilamide or sulfapyridine, again produced the typical thermal response.

Experiments on the Possible Cause of the Febrile Reaction.—In general there was no change in the hemoglobin concentrations or total white blood cell counts during or after the febrile reactions. Differential blood counts done at the time of the febrile reaction showed no abnormalities except eosinophilia in 4 cases. In 1 case a diffuse maculopapular dermatitis accounted for the eosinophilia of 12 per cent, while in another there was a persistent eosinophilia before the second course was administered. In the other 2 cases the eosinophil counts of 8 and 9 per cent respectively are unexplained except by the possibility that the eosinophilia was due to the administration of sulfathiazole.

The serum bilirubin, icterus index and urinary urobilinogen determinations remained normal during the febrile reaction. There was no relation between the blood sulfathiazole concentration and the development of the fever. The concentration of the blood sulfathiazole at the time of the reaction varied from 1.7 to 10 mg. per hundred cubic centimeters.

Crystals of sulfathiazole were found in the urine in 6 of 19 cases (31.6 per cent) in which this type of reaction developed. However, since crystals were found in the urine in one third of the cases in which fever did not develop, little significance can be attached to this finding. There was likewise no difference in the incidence of microscopic hematuria. The administration of sodium bicarbonate in doses equal to the sulfathiazole did not prevent the febrile reaction.

Scratch and patch tests with sulfathiazole were negative in 5 cases in which thermal reactions had previously been experienced. Passive transfer studies were done by injecting 0.05 cc. of serum in these 5 cases into the skins of 15 normal persons. Scratch tests with sulfathiazole were performed on the area of skin so prepared twenty-four hours later in 10 cases and forty-eight hours later in the remaining 5 cases. These were all negative.

COMMENT

The high incidence of fever (36 per cent) associated with the readministration of sulfathiazole strongly suggests that the use of the drug is accompanied by more danger than was formerly considered. Not only is the patient exposed to the usual toxic effects of the drug and to the deposition of crystals in the urinary tract but also he may become predisposed to the development of a severe febrile reaction should it be necessary to repeat the drug at a later date. Therefore it is apparent that the use of sulfathiazole should be reserved for the more virulent and serious infections.

The incidence of fever during a single course of sulfathiazole was much lower than the 36 per cent that occurred with the second course. Reports on the inci-

dence of sulfathiazole drug fever vary from 2 to 10 per cent.² In the 200 cases presented here in which one course of sulfathiazole was administered, only 5 experienced a febrile reaction, none occurring prior to the seventh day. This also corresponds with reports on other sulfonamide preparations which indicate that drug fever usually develops between the seventh and tenth days.³ Since it is usually unnecessary to give sulfathiazole for longer than one week (76 per cent of the 200 patients in this series received the drug for less than seven days) the incidence of fever in the initial course can be expected to be low. If the patients receiving sulfathiazole for less than seven days are eliminated the incidence of drug fever in this series is 10.4 per cent.

It was observed that the few patients receiving a second course five to seven days after the initial exposure to the drug did not show a febrile reaction earlier than the ninth day. This finding suggests that a period of time elapses before this reaction can occur.

There is still a considerable discrepancy between the 36 per cent with febrile reactions when a second course of sulfathiazole is given and the 10.4 per cent of patients with drug fever occurring during a single course of seven or more days. This suggests that perhaps the presence of an interval between the courses of the drug predisposes more persons to a febrile reaction. It is well known that antigenic agents may often be administered continuously without any deleterious consequences, but, if an interval is interposed between courses of the antigen, hypersensitive reactions are more apt to occur. A similar hypothesis can be postulated to explain the greater incidence of fever when sulfathiazole is not administered continuously.

It is possible that sulfathiazole when introduced into the body may develop antigenic properties which in certain instances produce a state of hypersensitivity. The manifestation of this hypersensitivity in these cases is the febrile response. The fact that in the patients studied an interval of at least nine days was necessary between the first contact with the drug and the occurrence of a febrile reaction on readministration of the drug favors this assumption. Further evidence lies in the ability to reproduce the reaction repeatedly even after intervals of as long as forty-one days. Occasionally it is possible to produce such a high degree of hypersensitivity to the drug that very small doses may elicit a febrile response. If the sensitized person is given a succession of small doses, the febrile response to a full 4 Gm. dose apparently diminishes in severity. It is possible that small doses partially desensitize the patient to sulfathiazole. The relative specificity of the reaction also points toward the antigenic nature of the drug. Sulfapyridine and sulfanilamide were tolerated without difficulty when administered to patients who had exhibited at least one febrile reaction with sulfathiazole. Some patients, not in this series, however, have been seen who have developed fever with the administration of sulfathiazole after having had sulfa-

2. Spink, W. W., and Hansen, A. E.: Sulfathiazole, J. A. M. A. 115: 840 (Sept. 7) 1940. Flippin, H. F.; Schwartz, Louis, and Rose, S. B.: Ann. Int. Med. 13: 2038 (May) 1940. Flippin, H. F.; Rose, S. B.; Schwartz, Louis and Domm, A. H.: Am. J. M. Sc. 201: 585 (April) 1941. Finland, Maxwell; Lowell, F. C., and Strauss, Elias: Ann. Int. Med. 14: 1184 (Jan.) 1941. Callomon, V. B., and Goodpastor, W. E.: ibid. 14: 1024 (Dec.) 1940.
3. Council on Pharmacy and Chemistry: Sulfathiazole, J. A. M. A. 116: 308 (Jan. 25) 1941. Lockwood, J. S.; Coburn, A. F., and Stokinger, H. E.: Studies on the Mechanism of the Action of Sulfanilamide, ibid. 114: 2259 (Dec. 17) 1938. Keefer, C. S.: M. Clin. North America 23: 1133 (Sept.) 1939.

pyridine or sulfanilamide. The demonstration of sensitivity to any drug by scratch, patch and passive transfer studies is in general exceptional; so the negative results do not necessarily rule out the hypothesis that this is a sensitivity reaction.

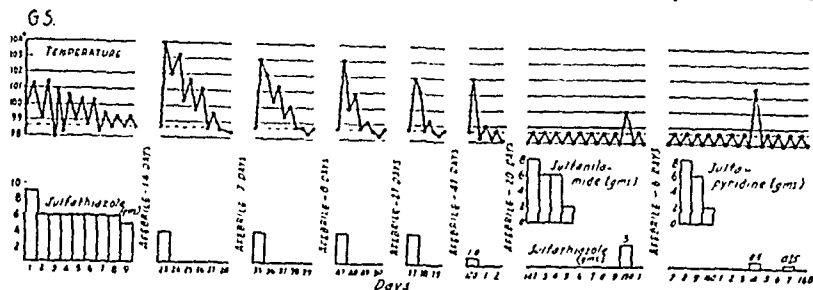


Chart 1 (case 1).—Seven febrile reactions produced by eight courses of sulfathiazole but no reaction with the final 0.25 Gm. dose. No reaction with sulfanilamide or sulfapyridine.

Other possible causes of the production of the febrile reactions have been considered and some at least can be eliminated. There is no evidence of a hemolytic crisis or other disturbance of the hemopoietic system. There is likewise no evidence suggesting involvement of the urinary tract as the cause of the reaction.

REPORT OF CASES

CASE 1.—G. S., a Negro aged 57, who had thrombophlebitis with cellulitis of the right leg, was treated with sulfathiazole for nine days until the temperature was normal and the cellulitis had regressed. After fourteen days with a normal temperature, 4 Gm. of sulfathiazole was administered for experimental purposes. Three hours later the patient had a severe chill, the temperature rose to 104 F., and weakness and exhaustion were noted. The fever gradually decreased over a period of five days after sulfathiazole was discontinued. A third course of sulfathiazole was started twelve days after the second course, the temperature having been normal for seven days. Two hours after the administration of 4 Gm. of sulfathiazole another pyrexial reaction developed. The temperature elevation persisted for three days. Twelve days later a fourth course was given consisting of 4 Gm. of sulfathiazole with 4 Gm. of sodium bicarbonate. Another reaction was experienced within two hours, and the fever persisted for two days. Thirty days later a fifth course consisting of a single dose of 4 Gm. of sulfathiazole and sodium bicarbonate was given, producing a reaction in three hours. Forty-one days later a single dose

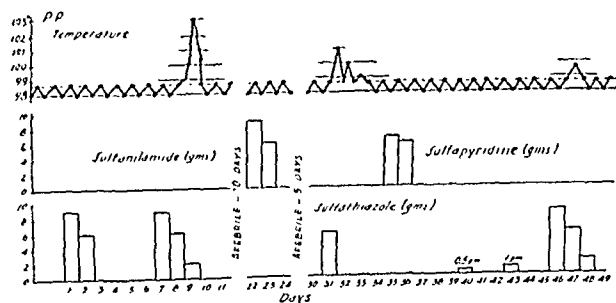


Chart 2 (case 2).—Three febrile reactions with sulfathiazole but no reaction with sulfanilamide or sulfapyridine or individual small doses of sulfathiazole. The first reaction to sulfathiazole occurred nine days after the initial exposure to the drug.

of 1 Gm. of sulfathiazole produced a typical reaction with temperature rising to 102 F. The temperature elevation persisted for only one day. After an afebrile interval of twenty days a four day course of sulfanilamide was uneventful. Four days later 1 Gm. of sulfathiazole was given every four hours for three doses and a temperature of 100 F. was observed. After six days without fever a three day course of sulfapyridine

was given but no febrile reaction ensued. Five days later 0.5 Gm. of sulfathiazole produced the seventh thermal response, the maximum temperature elevation being 101.4 F. A still smaller dose of 0.25 Gm. of sulfathiazole failed to produce any reaction three days later. On no occasion was eosinophilia present in the peripheral blood or were sulfathiazole crystals present in the urine. Scratch and patch tests and passive transfer studies were negative.

CASE 2.—P. P., a white man aged 65, with bronchiectasis, was considered a control, since he was afebrile and improving for two weeks before the study was started. Sulfathiazole was administered for two days without any complications. Four days later sulfathiazole was started again and after he received 15 Gm. in forty-eight hours a severe chill was experienced and the temperature became elevated to 103 F. The patient experienced nausea and vomiting with severe weakness and exhaustion. Twenty-four hours after the drug was discontinued the temperature became normal. After a twelve day afebrile period sulfanilamide was administered for two days but no reaction occurred. Seven days later 4 Gm. of sulfathiazole was given and a temperature of 101 F. occurred within eight hours, returning to normal within two days. After two days with normal temperature, sulfapyridine was given for two days without a febrile reaction. Then 0.5 and 1.0 Gm. doses of sulfathiazole were administered on different occasions without producing fever. Finally a full course of sulfathiazole was administered over a three day period and a very mild temperature elevation ensued. The temperature rose to 99.6 F. and remained elevated for only one day. This suggests that a partial desensitization to the drug was produced by the preceding small doses.

SUMMARY

1. Nineteen of 53 patients (36 per cent) to whom sulfathiazole was readministered experienced a febrile reaction shortly after the beginning of the second course, although no fever attributable to the drug was experienced during the first course.

2. Febrile reactions were characterized by a sharp rise in temperature from 102 to 106 F. and were often accompanied by chills and associated with prostration and weakness.

3. Eight of 10 patients who had a thermal reaction with the second course experienced a similar reaction when given a third course of the drug. Certain selected patients had multiple febrile reactions when given repeated courses of sulfathiazole.

4. No patient exhibited a thermal reaction earlier than the ninth day, although the second course in some instances was started as early as the fifth day after the initial contact with the drug.

5. A febrile reaction occurred with the readministration of the drug, although the interval between courses was prolonged to as long as forty-one days.

6. In a series of 200 consecutive routine hospital cases in which a single course of sulfathiazole was administered, a drug fever developed in only 5. None of these occurred before the seventh day. If the cases in which the drug was given for less than seven days are eliminated, the incidence of drug fever in this series is 10.4 per cent.

7. It is suggested that the fever is due to a drug hypersensitivity and that the incidence of this reaction is enhanced by an interval between courses in contrast to the continuous administration of the drug.

8. The patients in this series who exhibited a thermal response to readministration of sulfathiazole were able to tolerate sulfanilamide or sulfapyridine without fever.

THE MISUSE OF SULFONAMIDE
COMPOUNDS

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With the general acceptance and use of the sulfonamide compounds, it is inevitable that they should be tried in many types of infections for which they are not considered specific. Such enthusiastic use is quite understandable because of the miracles chemotherapy has already brought to medicine.

It is not my purpose in this communication to question the experimental use of these drugs. It is my purpose to question certain pernicious surgical practices which seem to discard sound surgical judgment for the attractive mysticism of a newly found drug. These practices include (a) the "prophylactic" implantation of one of the sulfonamide drugs in a clean operative wound,¹ or any wound which is to be closed and (b) the local implantation of one of these drugs at the site of an appendectomy or appendical abscess.²

These practices have gained widespread popularity throughout the country as well as in our own community. There has been little inquiry into their rationale. The magic name of a sulfonamide compound has been sufficient authority to stuff it into every cavity, scratch, wound or orifice possessed by the human body. Some of these practices are logical, others are not. Two questionable practices are discussed here.

IN CLOSED WOUNDS

First of all it must be emphasized that sulfonamide drugs are quite irritant to the tissues. This is true of all the sulfonamides in common use. When placed in the tissues in powdered form, they cause an inflammatory reaction in those tissues.³ The reaction may be

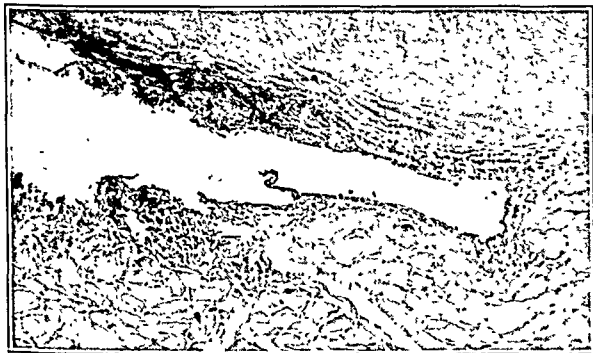


Fig. 1.—The illustrations show various inflammatory reactions produced by placing representative sulfonamide compounds beneath the anterior rectus sheath in the dog. Sections were taken after three days. This photomicrograph is a control, in which paraffin was placed beneath the rectus sheath. Paraffin has been dissolved out in the staining process, leaving an empty space. Note that there is practically no inflammatory reaction about this area.

moderate or it may be violent enough to cause the formation of an abscess.

In order to compare the irritant properties of these various drugs, a brief inquiry was undertaken. Approxi-

From the Departments of Surgery and Pathology, Indiana University School of Medicine.

1. Key, J. A., and Burford, T. H.: Prophylactic Implantation of Sulfanilamide in Clean Operative Wounds for Reduction of Postoperative Infections, *Surg., Gynec. & Obst.* **73**: 324 (Sept.) 1941. Diveley, R. L., and Harrington, P. R.: Chemotherapy in Infections of the Bones and Soft Tissues, *J. A. M. A.* **117**: 1868 (Nov. 29) 1941.

2. Jackson, H. C., and Collier, F. A.: The Use of Sulfanilamide in the Peritoneum, *J. A. M. A.* **118**: 194 (Jan. 17) 1942. Mueller, R. S., and Thompson, J. E.: Local Use of Powdered Sulfanilamide in Infections of the Peritoneal Cavity, *ibid.*, p. 189. Long and Dees.³

3. Key, J. A.; Frankel, C. J., and Burford, T. H.: The Local Use of Sulfanilamide in Various Tissues, *J. Bone & Joint Surg.* **22**: 952 (Oct.) 1940. Throckmorton.⁴

mately 1 grain (0.065 Gm.) quantities of common sulfonamides were placed beneath the anterior rectus sheath in the dog. The sheath was closed over the individual drug with a black silk suture and sections were removed three days later for microscopic study. Careful asepsis was maintained throughout the procedure. The powdered drug had been previously autoclaved. Drugs studied included sulfanilamide, sulfapyridine, sulfathiazole, sulfadiazine and sulfaguanidine.

It seemed desirable to have some type of control the better to evaluate the degree of irritation caused by these drugs. For this, small pieces of paraffin were



Fig. 2.—A similar area in which sulfanilamide has been placed. Note edema and moderate numbers of polymorphonuclears and monocytes.

buried beneath the rectus sheath and also sectioned for microscopic study after three days. Some paraffins are mildly irritant, but the one used produced practically no inflammatory reaction.

The results of this study were similar to those already reported.⁴ Representative findings are reproduced in the illustration. All the drugs produced an inflammatory reaction with severe edema and accumulation of inflammatory cells. The latter consisted mostly of polymorphonuclears with moderate numbers of monocytes. In the case of sulfathiazole and sulfadiazine, actual abscesses were formed about crystals which still persisted in the tissues. No crystals remained at the end of the three day period in any of the other drugs (sulfanilamide, sulfapyridine and sulfaguanidine). Inflammatory changes were least in the case of sulfanilamide.

It is not within the scope of this study to discuss why some of the sulfonamides are more irritant than others. Possibly it is because the more soluble drugs are quickly absorbed and have less opportunity to irritate the tissues. This would seem to be at least partially true, since sulfanilamide is relatively soluble compared with sulfathiazole or sulfadiazine. The point is that all these drugs in the pure powder form are irritating to tissues—some to the point of being actually caustic.

Therefore, to place such an irritating substance in a clean wound would seem to be a questionable procedure. It undoubtedly damages and even kills cells with which it comes in contact. Such chemical trauma violates the fundamental principles of careful surgery and wound healing.

This criticism is not leveled at the local use of the sulfonamides on ulcers or contaminated wounds which are left open. Undoubtedly the drugs have a place in these situations, but in the present state of our knowl-

4. Throckmorton, T. D.: The Peritoneal Response to Powdered Sulfonamide Compounds, *Proc. Staff Meet., Mayo Clin.* **16**: 423 (June 2) 1941.

edge it is certainly questionable that they should be sealed in any wound.

It is fully admitted that any drug which might be used locally as an antiseptic would be ideal if in so acting it did not damage the tissues more than the offending bacteria. Such a drug has not yet been demonstrated. At the present time it seems quite probable that such a drug will be developed in the future, but the present sulfonamides in powder form are most certainly not the answer.

A goodly number of enthusiastic reports are already in the literature singing the praises of sulfonamide powder implantation. It would seem that this testifies to the wonderful recuperative powers of human tissues under adverse circumstances rather than to the forethought of the operating surgeon.

IN APPENDICITIS AND APPENDICAL ABSCESS

During the past year a number of reports have appeared advocating the local use of sulfonamide drugs in cases of acute appendicitis or appendical abscess.² Several grams of the dry powder are placed in the peritoneal cavity presumably near the appendical focus. As much as 20 or 30 Gm. has been used in this manner.⁵

On first thought this would seem to be a logical procedure. It concentrates the drug in the local tissues far above that which might be reached by systemic administration. In fact the concentration reaches a point where the drug might be expected to exert a nonspecific effect as well as its expected action against specific organisms. What then are the objections to its use?

First of all, peritoneal adhesions may be expected if several grams of a powdered sulfonamide are placed in any one site. This is logical to assume, since it is well known that other irritants produce peritoneal adhesions and has already been demonstrated in animals.⁴ Of



Fig. 3.—After exposure to sulfadiazine, showing frank abscess about remaining clumps of the undissolved drug in the upper and central portion of the illustration. Inflammatory cells are practically all polymorphonuclears with a few large monocytes.

course, this objection is not valid in the case of a walled off appendical abscess. On the other hand there seems to be no indication for implanting the drug in such a situation, since adequate drainage is sufficient.

5. Long, L. W., and Dees, J. G.: The Local Use of Sulfanilamide, *Surgery* 9: 878 (June) 1941.

Second, after operation for acute appendicitis it is not the local area which is the trouble maker. This can be handled by adequate drainage. The serious complications are distant peritoneal abscess between loops of bowel or subphrenic abscess. These can in no way be altered or prevented by covering the cecum with a sulfonamide powder. The drug is absorbed locally and

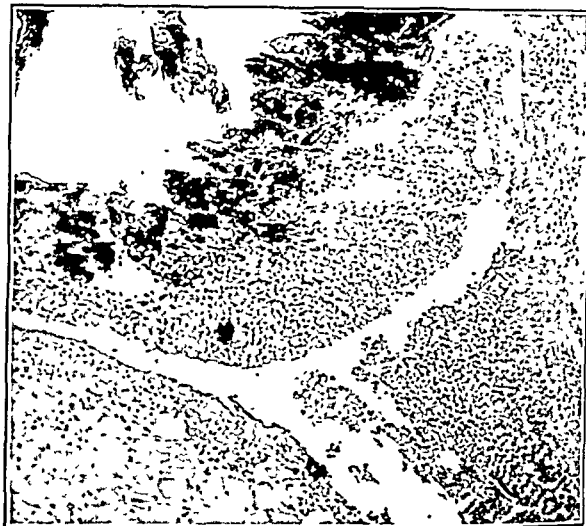


Fig. 4.—Sulfathiazole crystals are shown as dark amorphous masses in upper left. Surrounding them is a mantle of inflammatory cells. There was but little proliferation of fibroblasts in any of the sections at this early three day stage.

does reach the distant foci by way of the blood stream but in no greater concentration than if it was given by mouth or parenterally. Therefore it seems useless to expect any added benefit to the patient from a local instillation of the drug. Furthermore, the blood level of sulfonamides given in this manner rises abruptly but is sustained for only a short time. This necessitates parenteral or oral administration to maintain an adequate blood level. At best then the local use of sulfonamides in the peritoneum offers only a lazy means of giving the initial dose of the drug. It by no means sustains a blood level sufficiently high to be effective after the first few hours.

Lastly, and probably most important, local sulfonamide implantation gives the operating surgeon a false sense of security. He feels that he has utilized the latest and most modern therapy. The miracles these drugs have performed are well known to the public and the profession alike. The operator feels that there can at least be no harm in their local use. The harm is to the surgeon himself. He places faith in a questionable procedure, a procedure which he possibly has used to replace good careful surgery.

It should be emphasized that the foregoing criticism does not apply to the systemic use of the sulfonamides in cases of severe peritonitis. It is believed that this type of therapy is a permanent addition to surgery and will be more and more frequently used in the future.

SUMMARY

1. All common sulfonamide drugs are irritant to tissues when placed in them in powdered form.
2. The amount of inflammatory reaction which the individual drugs cause is variable. Some are caustic enough to produce actual abscess. All produce an inflammatory reaction.

3. The practice of placing one of these chemical irritants in a clean benign wound is not justified. It seems doubtful that any drug which produces so much damage to tissue cells could possibly be of sufficient value to warrant its use.

4. The implantations of a sulfonamide powder at the site of an appendectomy is also questioned. This practice cannot elevate the concentration of the drug at a distant peritoneal pus pocket above that obtainable by systemic administration.

5. Adhesions may result from application to bare peritoneum.

6. These procedures give the surgeon a false sense of security, to the detriment of sound surgical judgment.

7. This criticism is not in any way directed against the local or systemic use of the sulfonamides in ulcerations or in contaminated wounds which are left open. The same is true of the systemic use of these drugs in cases of severe peritonitis.

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EPIDEMIC OF ENCEPHALITIS, PRE- DOMINANTLY ST. LOUIS TYPE, IN PINAL COUNTY, ARIZ.

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AND

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Encephalomyelitis in horses has been present throughout Arizona for a number of years, but human encephalitis has rarely been reported.¹ During the summer of 1941 equine encephalomyelitis again appeared and soon afterward cases of human encephalitis began to occur in several parts of the state. In Pinal County, in southern Arizona, 18 human cases were studied during the months June to November. All but 3 of the patients were hospitalized. The etiologic diagnosis was established in most instances by repeated virus neutralization tests. Although the coincident equine outbreak pointed toward the western equine strain as the probable cause, the virus neutralization studies suggest that two viruses were responsible, western equine and St. Louis, with the latter greatly predominating. Clinically the cases could not be divided into two groups.

Since the discovery of the St. Louis encephalitis virus during the epidemic of 1933² it has been shown to be widely distributed throughout the United States. By 1937 outbreaks of encephalitis reported as due to the St. Louis virus had occurred in Missouri, Kansas, Illinois, Kentucky, Indiana and Ohio. Virus neutralization tests reported in 1935³ suggested that the virus was present in still other areas. In 1934 and succeeding years antibodies to St. Louis virus were found in the

bloods of patients in central California who were convalescing from attacks of encephalitis.⁴ In 1940 a mixed outbreak of St. Louis and western equine encephalitis was reported from the Yakima Valley in Washington.⁵ In 1941 in this area both these viruses were isolated from *Culex tarsalis* mosquitoes.⁶ In addition, it was found that neutralizing antibodies for St. Louis virus were present in serums from many species of domestic and wild mammals and birds⁷ and from many normal human beings.⁸ Also in 1941 antibodies to this virus were demonstrated in patients from an outbreak in Colorado.⁹ Antibodies to the St. Louis virus in the serums of other vertebrates have likewise been reported from California,⁹ Colorado,⁸ Massachusetts, Texas and Nevada;¹⁰ in the last four states observations were restricted to horses. However, only in the St. Louis area,² in Kansas City¹¹ and in the Yakima Valley⁶ has the virus been isolated or the infection proved to be due to this virus by demonstration of an increase in serum antibodies between an early and a late blood specimen.¹² The latter was repeatedly accomplished in the Arizona outbreak, making this the fourth area in the United States where satisfactory criteria for identification have been filled.

EPIDEMIOLOGIC DATA

The area in which this outbreak occurred is a flat triangle of irrigated land, 1,400 feet above sea level, lying south of the Gila River. Most of the land now under cultivation has been reclaimed within the past fifteen years. Cotton is the main crop. The summer heat is intense with maximum daily temperatures averaging 100 F. Rains are few and the humidity is low. Mosquitoes abound, breeding readily in the standing waters which accompany irrigation. Samples collected in the area during this season and sent to Mr. W. C. Reeves of the Department of Entomology of the University of California were identified as *Aedes vexans*, *Anopheles pseudopunctipennis*, *Culex pipiens*, *Culex stigmatosoma*, *Culex tarsalis*, *Culex quinquefasciatus*, *Psorophora confinnis* and *Theobaldia inornata*. Of these, *Aedes vexans* has been shown capable of transmitting the western equine virus in the laboratory, *Culex tarsalis* has been found infected with both the equine and the St. Louis virus in nature, and *Culex pipiens*

4. Wynns, H. L., and Hawley, C. J.: Epidemiology of Epidemic Encephalitis in California, *Am. J. Pub. Health* 29: 781-786 (July) 1939. Howitt, B. F.: Viruses of Equine and of St. Louis Encephalitis in Relationship to Human Infections in California 1937-1938; *ibid.* 29: 1083-1097 (Oct.) 1939. Buss, W. C., and Howitt, B. F.: Human Equine Encephalomyelitis in Kern County, Calif., 1938, 1939 and 1940, *ibid.* 31: 935-944 (Sept.) 1941.

5. Hammon, W. McD., and Howitt, B. F.: Epidemiological Aspects of Encephalitis in the Yakima Valley, Wash. Mixed St. Louis and Western Equine Types, *Am. J. Hyg.*, to be published. Hammon¹³

6. Hammon, W. McD.; Reeves, W. C.; Brookman, B.; Izumi, E. M., and Gullin, C. M.: Isolation of the Viruses of Western Equine and St. Louis Encephalitis from *Culex Tarsalis* Mosquitoes, *Science* 94: 328-330 (Oct. 3) 1941.

7. Hammon, W. McD.; Gray, J. A., Jr.; Evans, F. C.; Izumi, E. M., and Lundy, H. W.: Western Equine and St. Louis Encephalitis Antibodies in the Sera of Mammals and Birds from an Endemic Area, *Science* 94: 305-307 (Sept. 26) 1941. Hammon, W. McD.; Lundy, H. W.; Gray, J. A.; Evans, F. C.; Bang, F., and Izumi, E. M.: A Large Scale Serum Neutralization Survey of Certain Vertebrates as Part of an Epidemiological Study of Encephalitis of the Western Equine and St. Louis Types, to be published.

8. Philip, C. B., Cox, H. R., and Fountain, J. H.: Protective Antibodies Against St. Louis Encephalitis Virus in the Serum of Horses and Man, *Pub. Health Rep.* 56: 1388-1391 (July 4) 1941.

9. Howitt, B. F., and Van Herick, W.: Neutralizing Antibodies Against St. Louis and Western Equine Encephalitic Viruses in Horses and Fowl, *Proc. Soc. Exper. Biol. & Med.* 48: 247-250 (Oct.) 1941.

10. Hammon, W. McD.; Carle, B. N., and Izumi, E. M.: Infection of Horses with St. Louis Encephalitis Virus, Experimental and Natural, *Proc. Soc. Exper. Biol. & Med.*, to be published.

11. Webster, L. T., and Fite, G. L.: A Virus Encountered in the Study of Material from Cases of Encephalitis in the St. Louis and Kansas City Epidemics of 1933, *Science* 78: 463-465 (Nov. 17) 1933.

12. Smith, M. C., and Moore, E.: Neutralization of the Virus of St. Louis Encephalitis by Serum from Children, *J. Infect. Dis.* 63: 319-323 (Nov.-Dec.) 1938. Hammon¹³ Hammon and Howitt.¹⁴

From the Burton Cairns General Hospital of the Agricultural Workers Health and Medical Association, Casa Grande, Ariz., and the George Williams Hooper Foundation of the University of California (aided by a grant from the National Foundation for Infantile Paralysis, Inc.). Several physicians in Pinal County permitted us to follow their patients and obtain specimens. The Arizona State Health Department, in particular Mr. G. W. Marx of the Sanitary Engineering Division, cooperated in collecting a large number of the mosquitoes obtained for identification.

1. Milloy, F. J.: Encephalitis Lethargica. Four Case Reports, *Southwest. Med.* 21: 245-246 (July) 1937. Grauman, S.: Epidemic Encephalitis (Report of Sporadic Case), *ibid.* 21: 232-233 (July) 1940.

2. Muckenfuss, R. S.; Armstrong, C., and McCordock, H. A.: Encephalitis—Studies on Experimental Transmission, *Pub. Health Rep.* 48: 1341-1343 (Nov. 3) 1933. Webster and Fite.¹¹

3. Wooley, J. G., and Armstrong, C.: The Distribution of Immunity Against Encephalitis of the St. Louis Type in the United States as Determined by the Serum Protection Test in White Mice, *Pub. Health Rep.* 49: 1495-1505 (Dec. 14) 1934. Webster, Fite, Clow and Muench.¹²

has been demonstrated as capable of transmitting the St. Louis virus under laboratory conditions.

The patients studied were all members of the families of migratory agricultural workers; most of them had come to Arizona from Texas or Oklahoma within the preceding three years. These families reside in rural areas on the ranches where they are employed, living under conditions which permit maximal exposure to all environmental factors. Around these ranches are concentrated the relatively few domestic animals and fowl which are raised in the area. The migrant population during the summer season is approximately four thousand. The resident population numbers approximately seven thousand five hundred, of whom three thousand eight hundred reside in three small towns. It is of interest that no cases were reported among the residents of these three towns.

Cases occurred throughout July, August and September, and 1 in November with no epidemic peak. There were 13 cases in males and 5 in females. Seventeen patients were white; the other was a Negro. The age distribution differed from previously reported St. Louis

malaise, headache and aches in the back and the abdomen. The headache was at first occipital, later frontal as well, and was characteristically described as the worst the patient had ever had. Photophobia was present in varying degrees. Drowsiness was usually present. Temperature rose to a peak ranging from 101 to 106 F. within three days and fell gradually over a variable period which paralleled the severity of the illness. The average duration of fever was eight days. Nausea and vomiting were infrequently noted, a contrast to Hammon's findings in Yakima.¹⁵ In children the picture was far less distinctive. Irritability and drowsiness were common and convulsions were rare, in contrast to the described outbreaks of western and eastern equine encephalitis in small children. The diagnosis was usually suggested by the sustained fever.

The mental state varied from a slight drowsiness to deep coma. Neck stiffness and a positive Kernig sign were uniformly present, but only in exceptional instances did neck rigidity resemble that found in purulent meningitis. Abnormal neurologic findings were noted only in the more severe cases. These included tremor,

TABLE 1—Age, Date of Onset, Clinical and Laboratory Findings, Etiology and Sequelae

Patient	Age, Years	Date Onset	Peak Temperature, F.	Duration of Fever, Days	Initial Pressure		Cell Count per Cmm	M/P Ratio	Pandy	White Blood Count, per Cmm	Apparent Cause *	Present Status
					Mm	H ₂ O						
H. B.	8/12	11/2	103.2	8	80		50	5/2		17,000	St. L.	normal
P. B.	12/13	5/25	103.1	9	220		73	7/3	+	20,500	St. L. & W. E.	slight mental change
C. C.	15/12	5/28	101.6	8	140		91	9/1	++	15,200	uncertain	slight mental change
F. B.	3	7/18	107.1	6	50		46	4/6	++	27,200	uncertain	slight mental change
P. M.	1	7/18	103.2	6	70		52	5/2	±	32,000	uncertain	normal
B. L. S.	1	7/19	102.0	6	70		73	7/3	0		uncertain	normal
M. H.	1	9/11	103.6	8	120		64	6/4	+	15,500	St. L.	normal
C. A.	11	9/25	101.0	5	170		61	6/1	±	14,600	St. L.	normal
W. M.	16	7/22	101.1	11	215		64	6/4	±	10,000	St. L. & W. E.	severe CNS damage
L. K.	15	8/25	101.0	7	205		82	8/2	—	10,700	St. L.	normal
M. M.	24	8/21	105.2	11	235		61	6/1	+	13,000	St. L.	slight mental change
B. S.	25	6/27	105.2	11	15		10/0		++	15,500	St. L. & W. E.	moderate mental change
B. B.	48	8/15	104.0	7	175		55	5/2	0	14,500	St. L.	normal
O. H.	60	7/23	101.3	6	270		75	5/2	±	9,800	uncertain	normal
W. W.	62	9/19	101.2	9	115		80	4/6	+	11,900	St. L.	normal
J. H.	61	9/5	103.0	9	205		40	9/1	+	13,300	St. L.	normal

* See table 2

outbreaks in that half the patients were under 12 years of age. The morbidity rate for the migrant population was very high, approximately 450 per hundred thousand, and for the total population of the area approximately 157 per hundred thousand. No deaths occurred, although in all previous outbreaks the case fatality rates have been above 20 per cent. Two additional cases, confirmed by neutralization test, occurred in the adjoining Gila River Indian Reservation, one of which was reported as fatal.

Most of the encephalomyelitis in horses occurred during the latter part of June and July, somewhat before the majority of the human cases, as has been pointed out in numerous instances.¹³

CLINICAL FEATURES

The clinical and laboratory findings show no significant variation from those described in connection with the large St. Louis outbreaks.¹⁴ Some of the salient features of these data for each case are listed in table 1.

There was no clearcut prodrome. Frequently persons who were working in the fields on one day were seriously ill on the next. In adults the illness began with

ataxia, spasticity, nystagmus and altered deep reflexes. Puffiness of the face was in certain instances very noticeable. Persistent hiccups was noted in 1 case. Thrombophlebitis of the leg complicated the convalescence of 1.

Eight of the 18 cases were of sufficient severity to cause doubt concerning the patient's survival. Two of these patients were under 5 years of age, 4 between 5 and 50 and 2 over 60. Significant laboratory data are summarized in table 1.

CASE SUMMARY

The following report illustrates the features of a severe case.

W. M., a youth aged 16 years, came to Arizona from Oklahoma in late June 1941. During the following month he slept in the back seat of an automobile in an area infested with mosquitoes. On July 22 he became ill quite suddenly, complaining of headache, malaise, abdominal pain and pains in his arms and legs. He became increasingly drowsy. On July 26 he was admitted to the hospital. At this time he gave a coherent story of his illness. Physical examination showed neck stiffness, a positive Kernig sign, nystagmus and mental dullness. The temperature was 103.6 F. The white blood cell count was 12,500 with a differential count showing polymorphonuclears 68 per

¹³ Hammon and Howitt.⁸ Hammon, Lundy, Gray, Evans, Bang and Izumi.

¹⁴ Bozalis, G. S., and Jones, A. B. Epidemic Encephalitis, St. Louis Type. Survey of Outbreak, Summer and Fall of 1937, J. Oklahoma M. A. 31: 164-171 (May) 1938. Pub. Health Bull. 214, Report of the St. Louis Outbreak of Encephalitis, June 1935.

¹⁵ Hammon, W. McD. Encephalitis in the Yakima Valley. Mixed St. Louis and Western Equine Types, J. A. M. A. 117: 161-167 (July) 1941.

cent, lymphocytes 25 per cent and monocytes 7 per cent. Lumbar puncture showed an initial pressure of 215 mm. of water, normal excursion with jugular compression, cell count 205, mononuclear/polymorphonuclear ratio 6/4, Pandy positive. On July 29 the temperature was 103.2 F. The patient was completely irrational, incontinent, aphasic and grimacing. Thereafter the mental state remained much the same. On August 2 tremor and ataxia were severe. On August 16 he was discharged. The facial expression was fixed and he was still unable to talk or walk without help. Communications received two months later stated that he had improved considerably but showed extensive nervous system damage. Neutralization tests were made on three blood specimens. On the sixth day of illness they were negative. On the twenty-seventh and seventy-eighth days of illness they were 2 plus for the western equine and 1 plus for the St. Louis type.

NEUTRALIZATION TESTS

As will be noted in table 2, in which the results of all neutralization tests are presented, for most cases two blood specimens were tested and for many three. All were tested under carefully controlled conditions by the intracerebral mouse test described by Hammon and

be considered presumptive. The other 3 patients were all very young children, so their St. Louis antibodies are possibly significant. In the last group are 3 who show no rise in titer from an early to a late specimen. Low titers to one virus or both occurred in all. These also cannot be classified. However, several observations may be made which suggest a possible interpretation. A glance at table 1 shows that 4 of the "uncertain" group fall in the low age bracket (1½ to 4 years). Also it will be noted that 4 of the 6 patients 4 years of age or less showed no titer at any time for either virus above 1 plus. This poor antibody response may be characteristic of the lower age group.

One is naturally hesitant to assume that two etiologic agents are involved in one epidemic and especially that simultaneous double infection occurs in the same individual, although parallel examples now exist of similar immunologic findings in the group of influenzas. However, such definite evidence of antibody formation to both viruses as we have in patients W. M., P. B. and B. S., even if it was an isolated instance, would con-

TABLE 2—Results of Neutralization Tests

Patient	Days After Onset When Bled			Results of Tests						Apparent Cause
	Early	Inter- mediate	Late	St. Louis			Western Equine			
				Early	Inter- mediate	Late	Early	Inter- mediate	Late	
M. M.	6	21	66	0	0	++	0	0	0	St. Louis
M. B.	6	25	80	0	+	++	0	0	0	
M. H.	6		59	0		++	0		0	
W. W.	4	12	51	±	++	++	0	0	0	
J. H.	6		92	±		++	0		0	
L. K.	9	.	84	+		++	0	—	0	
H. B.	5	.	35	0		+	0		0	
C. A.	6		41	0		++	0		±	
W. M.	6	27	78	0	+	+	0	++	++	St. Louis and western equine
P. B.	5		69	0		++	+		++	
B. S.		25	59		0	+		±	++	
T. E.			100			++			0	Uncertain (no early speci- men)
C. C.			32		—	+		—	0	
B. L.		14		—	+			0	++	
G. E.			105			+			++	Uncertain (no change in titer)
E. W.	5	11	76	+	+	+	0	0	0	
O. H.	5	20		+	+		+	+	.	
P. M.	6		114	0		0	+		+	

Izumi.¹⁶ All serums were tested when fresh, for it has been noted by others¹⁷ as well as by one of us (W. McD. H.) that antibodies to the St. Louis virus decrease during storage. As has been pointed out in other studies,¹⁸ it will be noted that antibody response to the St. Louis virus is relatively slow.

The cases are grouped in table 2 according to the results of the neutralization tests. In the first group are 8 that showed a definite rise in titer to the St. Louis virus but developed no antibodies to the equine virus. The next group, 3 in number, is composed of those who showed a rise in titer to both viruses. In the third group are those in which only late specimens were obtained, all 4 with antibodies to the St. Louis virus and 1 to the equine in addition. No definite conclusions can be drawn in respect to these, although, since antibody to the equine virus is seldom encountered without history of a clinical infection, the evidence for equine infection in the 1 with equine antibodies (G. E.) can

stitute evidence of a strongly suggestive nature. As has been pointed out, in Yakima,⁵ where findings of a somewhat similar nature were encountered, definite proof of the presence and close association of the two viruses was eventually obtained by repeatedly finding them in the same species of mosquito. Here the immunologic evidence for St. Louis virus infection is indisputable in 11 cases. In addition to the immunologic evidence for the equine infection, the recognition of equine encephalomyelitis in this area greatly strengthens the evidence of the presence and activity of this second virus.

Although the number of observations is small, it may be of some significance that the 2 patients with the most severe residual central nervous system damage (W. M. and B. S., table 1) developed antibody to both viruses during the course of the illness, and the 1 other patient (P. B.) for whom we have similar evidence of double infection also suffers from residual damage.

At least one serum from almost every patient was tested against the eastern equine virus, but no positives were found.

DIAGNOSIS

The diagnosis is suggested by sustained fever, severe headache and signs of meningeal irritation and an elevated spinal fluid white cell count. However, in order to establish an etiologic diagnosis it is necessary

16 Hammon, W. McD., and Izumi, E. M. A Virus Neutralization Test Subject to Standardization. Used with Western Equine Encephalomyelitis, St. Louis Encephalitis and Mouse Adapted Poliomyelitis Viruses, J. Immunol. 43: 149-157 (Feb.) 1942.
17 Webster, L. T., Fite, G. L., Clow, A. D., and Muench, H. Experimental Studies on Encephalitis. Specific Inactivation of Virus by Sera from Persons Exposed to Encephalitis, St. Louis Type 1933, J. Exper. Med. 62: 827-847 (Dec.) 1935.
18 Webster and Fite.¹¹ Hammon.¹³ Hammon and Howitt.⁵ Smith and Moore.¹²

either to isolate the virus or to demonstrate a rise in serum antibodies during the course of the illness. Single late blood studies tend to mislead, for in many areas of the United States persons may acquire antibody to encephalitic viruses without ever having developed a clinically recognizable encephalitis.

SEQUELAE

Twelve of the 18 patients showed no apparent residue. Six showed definite mental impairment at the time of discharge from the hospital. All but 1 of these improved greatly during the ensuing six weeks, though they did not recover completely. Of the latter 2 were adults and 3 were children. One patient showed severe, undoubtedly permanent, mental and motor damage. His case, W. M., has been described in detail.

TREATMENT

The small number of cases makes it impossible to draw any conclusions about the efficiency of treatment. Two patients who had received no sulfonamide therapy turned out very badly. Thereafter all patients seen early received full doses of one of the sulfonamide drugs, mostly sulfadiazine. The effect of this drug was in no case dramatic, and it is questionable whether it had any effect at all. As yet there is no support for the effectiveness of the sulfonamides against the encephalitic viruses in experimental animals, and there is some negative evidence. However, in view of the fact that no deaths occurred in this series, judgment on the efficacy of this drug should be reserved. On the basis of the greater than 20 per cent case fatality in other St. Louis type epidemics, at least four or five deaths would be expected in this group.

SUMMARY

An epidemic of encephalitis occurred in Pinal County, Ariz., among migratory laborers. There were 18 cases, 15 of which were hospitalized. At least one serum from all was tested against both the St. Louis and the western equine viruses. The blood of all but 1 neutralized the St. Louis virus at some time. Eleven of 14 patients whose blood was tested more than once were shown to have developed antibody to this virus during the course of the illness, and 3 of these also developed antibody to the equine virus during the same interval. Half the patients were children under 12 years of age. No deaths occurred, but 6 have at present some residual central nervous system damage, one of a severe degree.

Intestinal Bacteria.—In the average adult it is estimated that each day's food in its passage through the digestive tract is subjected to the action of over one hundred billion bacteria, chiefly in the large intestine. . . . If it were possible to exclude absolutely all bacteria from the digestive tract, the well-being of the body would probably not be impaired; yet under such conditions as ordinarily exist, the bacteria which usually predominate in the digestive tract of the thoroughly healthy man probably render an important service in helping to protect against noxious species. *Lactobacillus acidophilus* has come to be regarded as the species best adapted to the function of maintaining a favorable condition in the human intestine. The taking of cultures of this organism and the liberal consumption of lactose and dextrin, the carbohydrates most favorable to it, may assist in the establishment and maintenance of a good condition of intestinal hygiene.—Sherman, Henry C.: *Chemistry of Food and Nutrition*, New York, Macmillan Company, 1941.

THE TYPHOID CARRIER PROBLEM

REPORT OF A STUDY OF ONE HUNDRED AND TEN
TYPHOID CARRIERS AT THE MANTENO STATE
HOSPITAL, MANTENO, ILL.

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The medical and economic importance of the typhoid carrier problem is readily estimated when one realizes that as many as 44 per cent of all cases of typhoid are due to carriers.¹ Gay² in 1918 stated that 150,000 cases of typhoid occur yearly in the United States with an annual production of approximately 7,500 carriers. Cumming³ calculated that in Washington, D. C., in 1930, twenty years after commencement of preventive measures against typhoid, there were 671 carriers per hundred thousand of the population. Stebbins⁴ estimated that as of Jan. 1, 1936 there were approximately 5,000 typhoid carriers in New York State exclusive of New York City. This city reported 405 chronic typhoid carriers under the supervision of the department of health as of July 1, 1936.⁵ At the close of 1939 there were 422 typhoid carriers under supervision in upstate New York.⁶ Bigelow and Anderson⁷ estimated 1,100 typhoid carriers in the state of Massachusetts in 1933.

The part played by human carriers in the spread of typhoid fever was first clearly recognized by Robert Koch⁸ in his famous address of November 1902. Even at that time he considered the typhoid patient or convalescent as the most fruitful source of further infection.

Today, almost forty years later, it is interesting to note that at a recent symposium on the typhoid carrier problem held at the New York Post Graduate Hospital⁹ it was agreed that during the past five years no cases of typhoid due to contaminated water supply had occurred in the state of New York, while carriers have been directly responsible for a large proportion of cases. Knowlton¹⁰ reports that in the state of Connecticut not a single case of typhoid was traced to water, food or milk during the past four years.

The first authentic typhoid carrier in this country, Typhoid Mary of New York, was reported in THE

From the Manteno State Hospital.

The sulfaguandine used in this study was supplied by E. R. Squibb & Sons.

Dr. H. J. Shaughnessy of the State Public Health Laboratory conducted the bacteriologic work in this study; Dr. M. S. Palmer of the Manteno State Hospital did the x-ray work and Dr. D. J. Cohn of Michael Reese Hospital made the blood determinations of sulfaguandine.

1. Garbat, A. L.: Typhoid Carriers and Typhoid Immunity, Monograph 16, New York, Rockefeller Institute for Medical Research, May 1922.

2. Gay, F. P.: Typhoid Fever, New York, Macmillan Company, 1918.

3. Cumming, J. G.: Should Barriers Against Typhoid Be Continued? J. A. M. A. 98: 93 (Jan. 9) 1932.

4. Stebbins, E. I.: The Detection and Control of Typhoid Carriers, symposium on the typhoid carrier problem at the New York Post Graduate Hospital, June 6, 1936.

5. Frant, S.: The Typhoid Carrier Situation in New York City, symposium on the typhoid carrier problem at the New York Post Graduate Hospital, June 6, 1936.

6. Report on Typhoid Carriers, New York News, J. A. M. A. 115: 790 (Aug. 31) 1940.

7. Bigelow, G. H., and Anderson, G. W.: Cure of Typhoid Carriers, J. A. M. A. 101: 348 (July 29) 1933.

8. Koch, Robert: Sitzung des wissenschaftlichen Senates bei der Kaiser Wilhelms Akademie, Nov. 28, 1902.

9. Hanssen, E. C.: The Present Status of the Typhoid Carrier Problem, New York State J. Med. 39: 1347 (July 15) 1939.

10. Knowlton, M.: The Typhoid Carrier Problem in Connecticut, symposium on the typhoid carrier problem at the New York Post Graduate Hospital, June 6, 1936.

JOURNAL in 1907.¹¹ Her life history has been the subject of a recent biography.¹² To her 51 cases of typhoid and three deaths were attributed.

Ever since, the management of typhoid carriers has presented a most difficult problem to the various health agencies. Numerous states have special regulations for dealing with typhoid carriers. For example, the regulations of the Department of Health of New York City for the supervision of typhoid carriers (1922) forbid them to handle food or drink intended for the use of others or to send clothing to the laundry before disinfection. The movements and whereabouts of carriers must be reported to the department and their discharges examined from time to time. Rules are laid down regarding personal hygiene and the disposal of excreta.¹³ In the state of Illinois carriers are prevented from engaging in certain occupations such as food handling and dairy work and are supervised in order to avoid the spread of the disease.¹⁴

As compared with the carrier who is sane, the control of the typhoid carrier in hospitals caring for mentally ill patients is even more difficult. Such persons are a continual menace both to inmates and attendants and often are the cause of repeated outbreaks of the infection. In Scotland all known psychotic carriers are segregated in a single institution.¹⁵

The present study is the outcome of clinical, bacteriologic and therapeutic observations conducted on

TABLE 1.—Number and Percentage of Carriers With or Without Previous Active Typhoid Disease

Total number of carriers.....	110	
Number of carriers with previous active disease...	54	49.1%
Number of carriers without previous active disease	56	50.9%

110 typhoid carriers at the Manteno State Hospital extending over a period of one year. A violent outbreak of typhoid in 1939 was followed by a typhoid carrier state in numerous patients who did or did not have signs of active disease during the epidemic (table 1). These patients were segregated in a single unit so that hygienic as well as medical procedures could be carried out with a minimum of danger to the environment and with a maximum of efficiency.

CLINICAL OBSERVATIONS

In general, all patients felt remarkably well, and there was no evidence by way of physical examination to indicate the typhoid carrier state. There was nothing to demonstrate a lowered resistance or an increased susceptibility toward infection. In view of the well known involvement of the biliary tract and gallbladder in typhoid, particular attention was paid to clinical or roentgen evidence of gallbladder disease. There were 7 female carriers who experienced more or less severe attacks of pain in the right upper part of the abdomen associated with vomiting, nausea and a subicteric state. The attacks were interpreted as biliary colics. Cholecystograms performed on 80 carriers revealed gallbladder disease in 57 cases as evidenced by lack of dye concentration, nonfilling of the gallbladder and the presence of calculi in 6 cases (table 2).

11. Soper, G. A.: The Work of a Chronic Typhoid Germ Distributor, J. A. M. A. 48: 2019 (June 15) 1907.
12. Soper, G. A.: The Curious Career of Typhoid Mary, Bull. New York Acad. Med. 15: 698 (Oct.) 1939.
13. ...ic Enteric Carriers and Their Treatment, ...cial Report Series, No. 179, London, His ...33.
14. ...of Public Health, State of Illinois, Chicago 1939.
15. ...of the General Board of Control, Edinburgh, 1929 (cited by Browning¹⁶).

AGE AND SEX

Table 3 shows a striking preponderance of females in our series.

Uhlenhuth¹⁶ states that 80 per cent of typhoid carriers are adult females. Children have rarely been reported as being typhoid carriers. The frequency of disorders of the biliary tract in older women seems to be responsible

TABLE 2.—Number and Percentage of Eighty Carriers With and Without Roentgen Evidence of Gallbladder Disease

Total number of carriers examined.....	80	
Number of carriers with x-ray evidence of gallbladder disease	57	71.3%
Number of carriers without x-ray evidence of gallbladder disease	23	28.8%

TABLE 3.—Distribution of Sex Among One Hundred and Ten Typhoid Carriers

Sex	Number	Per Cent
Females	76	69.1
Males	34	30.9

for the preponderance of females among typhoid carriers. The opinion has been expressed that a typhoid carrier does not have as great a life expectancy as a person of the same age in the general population.¹⁷ Our series does not substantiate this point of view. Classification according to age (table 4) revealed most of the patients in the age group between 40 and 60. There were 45 patients past the age of 50, 15 past the age of 60 and 4 past the age of 70. The oldest typhoid carrier on record seems to be the 1 reported recently in THE JOURNAL,¹⁸ a woman aged 101 who has probably been a typhoid carrier for eighty years. The importance of age will be referred to in our discussion concerning surgical therapeutic procedures.

TABLE 4.—Respective Age Group Among One Hundred and Ten Typhoid Carriers

Age Group	Number	Per Cent
20-30	11	10
30-40	23	20.9
40-50	31	28.2
50-60	30	27.3
60-70	11	10
70-80	3	2.7
80-90	1	0.9

TABLE 5.—Bacteriologic Classification of One Hundred and Ten Typhoid Carriers

	Number	Per Cent
Bile carriers	65	59.1
Intestinal carriers	43	39.1
Urinary carriers	2	1.8

CLASSIFICATION OF CASES

The cases were classified into bile, intestinal and urinary carriers (table 5). The bile carrier state was determined by bacteriologic examination of bile obtained through duodenal drainage. A Rehfuß tube was introduced in the morning on a fasting stomach and was allowed to remain until duodenal fluid was obtained.

16. Uhlenhuth, P.: Das Problem der Typhusbazillenträger und ihre Bekämpfung, Med. Klin. 30: 789 (June 15) 1934.
17. Forsbeck, F. C.: Blood Pressure of Typhoid Carriers, Science 80: 478 (Nov. 23) 1934.
18. A Typhoid Carrier at 101, New York News, J. A. M. A. 114: 1276 (March 30) 1940.

Forty cc. of olive oil was then injected into the duodenum, which usually was followed by production of dark gallbladder bile within fifteen minutes. Olive oil was considered preferable to magnesium sulfate because of the possible germicide action of the latter.

In contradistinction to previous reports,¹⁹ we have found in our series that as many as eight intubations were necessary in order to determine the presence or absence of the bile carrier state (table 6). Fecal carriers

TABLE 6.—The Necessity of Repeated Duodenal Drainage in Order to Determine Definitely the Bile Carrier State

	Number of Carriers In Whom Positive Bile Cultures Were Obtained	Per Cent
First duodenal drainage.....	27	41.5
Second duodenal drainage	11	16.9
Third duodenal drainage	6	9.2
Fourth duodenal drainage	10	15.4
Fifth duodenal drainage	7	10.8
Sixth duodenal drainage	3	4.6
Seventh duodenal drainage	1	1.5

whose bile was negative after eight intubations were classified as intestinal carriers. There were only 2 urinary carriers in our series, both of whom were also fecal carriers.

All in all, out of 110 fecal carriers, 15 could not be submitted to biliary drainage owing to lack of cooperation. Out of 95 persons submitted to biliary drainage 65, or 68.4 per cent, were found to be bile carriers. An attempt to further subdivide bile carriers into liver and gallbladder carriers proved unsuccessful in our hands. Aside from difficulties in differentiating between "liver bile and gallbladder bile," the samples, when obtained, were uniformly either positive or negative.

THERAPEUTIC OBSERVATIONS WITH SOLUBLE IODOPHTHALEIN

In a previous communication by Saphir and Howell,²⁰ experiments were reported as to the *in vitro* action of soluble iodophthalein on the bacteria of the typhoid-paratyphoid group. It was found that the dye in dilution of 1:30 retarded the growth of typhoid bacilli in one hour, while two hour contact resulted in death of typhoid bacilli. Previously, Onodera and his associates²¹ had reported a strongly germicidal action of the dye on typhoid bacilli, whereas Nickel²² found that soluble iodophthalein had a decided bacteriostatic action *in vitro* on staphylococci and streptococci, destroying them in dilution of 1:20 in ten minutes. However, he observed only slight action on gram-negative bacilli of the colityphoid group. In his studies he found that intravenous injection of soluble iodophthalein prevented streptococcal invasion of the gallbladder of rabbits.

Clinically, 1 paratyphoid carrier reported by Saphir and Howell²⁰ and 1 typhoid carrier reported by Enright²³ were apparently cured by treatment with soluble iodophthalein.

It was therefore considered justified to try this form of treatment on a larger series of cases under controlled

conditions. A priori it was expected that only bile positive cases would benefit from treatment with a biliary antiseptic, and it was therefore decided to submit our 65 bile carriers to treatment.

Four Gm. of soluble iodophthalein was administered orally in orange juice three times a week until a total of forty doses had been given. The patients were kept on a low fat diet in order to avoid, if possible, unnecessary contractions of the gallbladder. For the same reason the dye was given in the early morning so that the maximum dye concentration in the gallbladder was reached at night when rest and absence of food intake might permit the gallbladder to remain quiescent. Thus optimum conditions for a full bactericide effect on bacilli in the gallbladder could be anticipated.

No ill effect was observed from the treatment except some nausea and occasional vomiting following the administration of the dye. In a few cases a mild to moderate diarrhea developed, apparently due to the phenolphthalein content of the drug. This, however, could be easily controlled by ordinary antidiarrheic measures and in no case required cessation of treatment.

RESULTS

Out of 65 bile carriers treated, in 21, or in 32.3 per cent, sterilization of bile was obtained (table 7). Criteria for sterilization of bile were three negative bacteriologic reports of bile, obtained through duodenal drainage on three subsequent occasions.

To our great disappointment we found that 16 out of the 21 persons whose bile became sterile continued to excrete typhoid bacilli in the stools. It thus became apparent that in spite of the apparently cured bile carrier state, an additional intestinal carrier state was present in these 16 instances. It is quite conceivable that the typhoid infected bile in passing through the intestinal tract for a prolonged period of time may set up additional "typhoid foci" in the intestinal tract from which bacilli continue to be excreted, an opinion expressed by Garbat.¹ Consequently, only 5, or 7.6 per cent, of the treated persons were considered cured from the typhoid carrier state up to the present writing. The criterion for cure was the absence of typhoid bacilli from at least 10 consecutive stool specimens over a period of at least four months.

Unfortunately, there is no way of determining an additional intestinal carrier state in a bile carrier. It is only after sterilization of bile that the true nature of the carrier state becomes apparent, because of the continu-

TABLE 7.—Results of Treatment with Soluble Iodophthalein of Sixty-Five Bile Carriers

Total number treated.....	65
Number in whom sterilization of bile was obtained.....	21 or 32.3%
Number in whom sterilization of stool was obtained.....	5 or 7.6%

ation of excretion of typhoid bacilli in the feces. This excretion may be intermittent and difficult to detect. Some of our treated patients had as many as ten weekly consecutive negative stool reports before a positive culture was obtained. It is for this reason that the criteria for cure were adopted.

Why was sterilization of bile obtained in only 32 per cent of the persons treated?

As already stated, only a concentration of 1:30 acting for two hours will permit soluble iodophthalein to destroy typhoid bacilli. Apparently the anatomic con-

19. Forsbeck, F. C., and Hollon, H. C.: Standards for Determining the Suitability of for Detection or Release of Typhoid Carriers, *Am. J. I.*

20. Saphir, Soluble Iodophthalein Group, *J. A. M. A.* 114: 1988 (A).

21. Onodera, N.; Murakawa, G., and Liu, S.: Ueber eine neue Behandlung von Typhusbazillenträgern, *Deutsch. Arch. f. klin. Med.* 171: 503, 1931.

22. Nickel, A. Sodium-N. N. R. (Tetraiodophenolphthalein) as an of the Biliary Tract, *J. Pharmacol. & Exper.* 1929.

23. Enright, J. R.: Apparent Cure of a Typhoid Carrier with Soluble Iodophthalein, *J. A. M. A.* 116: 220 (Jan. 18) 1941.

ditions of the biliary tract and the gallbladder were unfavorable to such concentrated and prolonged action on typhoid bacilli in those cases which did not respond. This does not seem surprising in view of the frequency of biliary tract disease in typhoid infections. Lack of concentration power of the gallbladder as determined by cholecystograms was frequently present in our series. All our cured patients showed a normal response to cholecystography.

THERAPEUTIC ATTEMPTS WITH SULFAGUANIDINE

Marshall and others²⁴ have reported curative results with sulfaguanidine in the treatment of acute bacillary dysentery. In preference to other sulfonamide compounds, sulfaguanidine is considered to be of particular value in the treatment of enteric infections because of its slow absorption from the intestinal tract, thus exerting a prolonged effect on enteric bacteria. In a recent paper Levi and Willen²⁵ reported curative results with sulfaguanidine in a typhoid carrier.

We were especially interested in treating those carriers with sulfaguanidine whose bile was free from typhoid bacilli, either as the result of treatment with soluble iodophthalein or because of the finding of bacilli in the feces in the presence of negative bile throughout the study.

Five such patients were treated with sulfaguanidine. The dose given was 0.05 Gm. per kilogram of body weight four times daily for a total period of two weeks. There were no severe reactions from the administration of the drug, although some vomiting, slight elevation of temperature, conjunctivitis and cystitis were observed. However, the symptoms were comparatively mild and cessation of treatment was not required. Sulfaguanidine blood levels were determined and were found not to exceed 1.2 mg. per hundred cubic centimeters.

The results were uniformly unsatisfactory. In all cases in which treatment was given the bacillary excretion continued unabated.

COMMENT

Once the typhoid carrier is detected, the problem resolves itself into the question of whether the carrier should be treated or just controlled. If controlled carriers were not a source of danger to the community, we could not contend that they must be treated.⁹ However, the literature mentioned provided ample proof of the danger of spreading typhoid through carriers in spite of measures taken to control their activities.

In view of the absence of legislative measures compelling treatment, we believe that treatment should be urged as a measure intended primarily to benefit the carrier rather than to protect the community.

In spite of many attempts to evolve a cure for the typhoid carrier state, the most extensive review of this subject in recent years¹³ reveals that "drug treatment, chemotherapy, measures aimed at alteration of the reaction of the flora of the intestines and vaccine therapy have all proved ineffective."

In 1936 the Royal Medico-Psychological Association of England appointed a committee to study the treatment of enteric carriers in psychopathic hospitals.²⁶ After

considering all the evidence, the committee recommended that cholecystectomy appears to be the only treatment which has any reasonable chance of success, unless the patient is a urinary carrier, in which case cholecystectomy is useless.

The value of cholecystectomy in the treatment of typhoid carriers is well established. This is particularly true when, through the use of duodenal drainage, the bile is found to contain typhoid bacilli.⁷

In the light of our study it would seem that treatment with soluble iodophthalein should be given serious consideration before cholecystectomy is resorted to. The indications for the two forms of treatment are the same, namely the presence of typhoid bacilli in the bile. The results will be problematic if typhoid bacilli are not found in the bile. However, we have presented the difficulties in definitely ruling out the bile carrier state. In our series, eight consecutive biliary drainages were necessary before the presence or absence of the biliary carrier state could be ascertained. It therefore may be worthy of trial to treat a questionable fecal carrier with soluble iodophthalein.

Cholecystectomy has effected cure in 75 per cent of the cases according to some statistics.¹³ Our results with soluble iodophthalein have been less striking. Sterilization of bile was obtained in 32.3 per cent and complete cure in only 7.6 per cent of the persons treated.

We wish, however, to emphasize the following factors in favor of our conservative treatment. First, the safety of the treatment in our hands as compared with the mortality of cholecystectomy, particularly in the age group over 50. In our series there were 45 persons, or 40.9 per cent, past the age of 50. Second, the treatment as outlined was our first and necessarily experimental attempt toward a cure. It may well be that changes in dosage, duration of treatment and time interval may improve the results. Finally, all our treated patients were known carriers for more than two years. It is well known that the longer the typhoid carrier state persists, the more difficult the eradication of typhoid bacilli is apt to be. The old dictum "once a typhoid carrier, always a chronic typhoid carrier" gives ample testimony to the futility of therapeutic attempts in the past. Had we not permitted the carrier state to persist too long and thus to set up additional intestinal typhoid foci which cannot be eradicated either by cholecystectomy or soluble iodophthalein, it is our belief that the percentage of cures might have been higher.

SUMMARY AND CONCLUSIONS

1. Clinical, bacteriologic and therapeutic studies on 110 typhoid carriers bring out the difficulties inherent to the typhoid carrier's problem.

2. Treatment with sulfaguanidine in 5 cases had no effect on the bacillary excretion in the stool.

3. The oral treatment with soluble iodophthalein of 65 bile carriers sterilized the bile in 32.3 per cent and freed the stool from typhoid bacilli in 7.6 per cent of the carriers.

4. Treatment with soluble iodophthalein should be given consideration before cholecystectomy is resorted to, particularly in bile carriers past 50 and in the presence of a well functioning gallbladder, as determined by the cholecystogram.

104 South Michigan Avenue.

24. Marshall, E. K., Jr.; Bratton, A. C.; Edwards, L. B., and Walker, E. Sulfaguanidine in the Treatment of Acute Bacillary Dysentery in Children, *Bull. Johns Hopkins Hosp.* 68: 94 (Jan.) 1941.

25. Levi, J. E., and Willen, Abner: The Typhoid Carrier State Treated with Sulfaguanidine, *J. A. M. A.* 116: 2258 (May 17) 1941.

26. The Value of Cholecystectomy in the Treatment of Enteric Carriers in Mental Hospitals, report of the infectious diseases subcommittee of the research and clinical committee of the Royal Medico-Psychological Association, *J. Ment. Sc.* 82: 263, 1936.

IS LYMPHOSARCOMA CURABLE?

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In 1926 Minot and Isaacs¹ published a paper on lymphoblastoma. By that term they meant to include leukemia, Hodgkin's disease, lymphosarcoma and allied disorders. After a careful statistical study of 477 cases they came to the conclusion that all these diseases were incurable. They found that about 10 per cent of the patients had had the disease for six years or longer. Although a number of patients who survived for a long time had been treated by roentgen rays, surgery or a combination of the two, there were some who had received no curative treatment, and the authors felt that it was not possible to conclude that any had been cured by treatment even though they could not deny definite amelioration in some cases.

Since that time there have been remarkably few studies of the results of treatment of this group as a whole, and of lymphosarcoma in particular. Most of the studies made have tended to confirm the opinions expressed by Minot and Isaacs. Desjardins² in 1932 stated that "permanent cure of lymphosarcoma is unknown." He felt that radiotherapy might prolong life but was opposed to surgery. Krumbhaar³ in 1936 remarked that "the lymphomatoid diseases are practically all alike in having a fatal prognosis, though the duration may extend from a few days to many years."

The most important recent study of lymphosarcoma in general is by Sugarbaker and Craver⁴ from the Memorial Hospital, New York. This includes a group of 196 patients seen during the twenty year period ending in 1938. For purposes of survival studies they excluded recent patients and those who died or were lost without recurrence. This left 132 patients. Twenty-one of these (15.9 per cent) survived five years. Seven of them either died of lymphosarcoma or had the disease persisting when last seen, leaving only 14, or 10.6 per cent, free from disease after treatment.

Sugarbaker and Craver list five factors which influence the course of the disease: 1. Individual inherent qualities for growth and dissemination in the different tumors, i. e., many run a rapid course but a few may be very slow. Microscopic examination they find does not help one in foretelling this, although in general the giant follicle lymphosarcomas run a less rapid course. 2. The extent of the disease on admission. Only 4 of 21 patients who survived long had clinical evidence of disease in more than two contiguous areas. 3. The location of the primary lesion. The results were better when the primary site was in the head end of the body (23 per cent five year survivals and 15.4 per cent

symptom free).⁵ Sugarbaker and Craver had no patients who survived long when the primary lesion was in the gastrointestinal tract, which is contrary to the experience of others. 4. Complicating leukemia and pseudoleukemia. Of their series 6.6 per cent of the patients had leukemia and all died. 5. Age. The average survival rate of the 0-29 year age group was only eleven and three-tenths months, while for later age groups it was more than twice that figure. As will be seen, the present study confirms these observations except with regard to histology and the gastrointestinal tract.

TABLE 1.—Lymphosarcoma (1915-1935 Inclusive)

Primary Site	Number of Cases	Survived 5+ Years		Died or Alive with Tumor After 5 Years		Symptom Free 5+ Year, per Cent
		No	Per Cent	No	Per Cent	
A—All Cases						
Cervical nodes	45	7	15.6	1	2.2	13.4
Axillary nodes	11	3	27.3	1	9.0	27.3
Femoral inguinal nodes	20	6	30.0	5	25.0	30.0
Retroperitoneal and mesen- teric nodes	30	4	13.3	3	10.0	3.3
Mediastinal nodes	10	0	0	0	0	0
Generalized	41	1	2.4	0	0	2.4
All nodes	157	21	13.4	10	6.4	7.0
Mouth, nasopharynx and salivary glands						
Gastrointestinal	19	6	31.5	0	0	31.5
Skin and orbit . . .	12	3	25.0	2	16.7	8.3
Spleen and thyroid . .	4	0	0	0	0	0
Total	218	36	16.5	13	6.0	10.5
B—Treated Cases						
Cervical nodes . . .	37	7	19.0	1	2.7	16.3
Axillary nodes . . .	9	3	33.3	1	11.0	22.3
Femoral inguinal nodes	14	5	35.7	4	28.5	7.2
Retroperitoneal and mesen- teric nodes	17	3	17.7	2	12.0	5.7
Mediastinal nodes	5	0	0	0	0	0
Generalized	26	1	3.8	0	0	3.8
All nodes	108	19	17.6	8	7.0	10.6
Mouth, nasopharynx and salivary glands						
Gastrointestinal	16	6	37.5	0	0	37.5
Skin and orbit . . .	8	3	37.5	2	25.0	12.5
Spleen and thyroid . .	3	0	0	0	0	0
Total	156	34	21.8	11	7.0	14.8
C—Untreated and Unknown						
Total.	62	2	3.2	2	3.2	0

All preceding studies agree that some cases of lymphosarcoma have a long, natural duration. For that reason, it would seem, the five year period of observation is not long enough to decide whether permanent cures have been effected. It is known that at least one third of the five year survivors have persisting disease and it is argued that the rest may all eventually die of it. The present study was undertaken with this point particularly in mind.

Before I discuss our results, it seems necessary to make a statement regarding the criteria used to make the diagnosis of lymphosarcoma. Obviously this is a loose term and has never been clearly defined. Most observers today are unwilling to follow Minot and

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1. Minot, G. R., and Isaacs, Raphael. Lymphoblastoma (Malignant Lymphoma), J. A. M. A. 86: 1185-1189 (April 17), 1265-1270 (April 24) 1926.

2. Desjardins, A. U. Radiotherapy for Hodgkin's Disease and Lymphosarcoma, J. A. M. A. 99: 1231 (Oct. 8) 1932.

3. Krumbhaar, E. B. The Lymphomatoid Disease, J. A. M. A. 106: 286 (Jan. 25) 1936.

4. Sugarbaker, E. D., and Craver, L. F. Lymphosarcoma: A Study of 196 Cases with Biopsy, J. A. M. A. 115: 17-23 (July 6), 112-117 (July 13) 1940.

5. The experience of others tends to confirm this. Jutra (Contribution à l'étude des influences anatomopathologiques et radiotechniques dans le traitement des sarcomes lymphoïdes du pharynx par radium et rayons X, J. de radiol. et d'électrol. 19: 425 (Aug.) 1935) of the Paris Radium Institute reported 25 per cent survivals over five years for lymphosarcoma of the pharynx.

Isaacs in merging all malignant lymphomatoses with Hodgkin's disease under the all inclusive term lymphoblastoma, and they are not expert enough in histologic methods to utilize Robb-Smith's⁶ elaborate subdivision of what he chooses to call "reticulosarcoma." This is based on Maximow's hypothesis of the pluripotency of certain primitive cells of the embryonic mesenchyme, which may persist throughout life and consists of twelve

TABLE 2.—*Lymphosarcoma (1915-1930 Inclusive)*

		Survived 10+ Years		Died or Alive with Tumor 10+ Years		Symptom Free 10+ Years, Per Cent
		No.	Per Cent	No.	Per Cent	
All cases.....	90	8*	8.9	2†	2.2	6.7
Treated cases.....	48	7	14.6	1	2.1	12.5
Untreated cases.....	42	1	2.4	1	2.4	0

* These cases were distributed as follows: lymph nodes 4 (1 untreated); oral cavity and nasopharynx 2; stomach 2.

† These cases were primary in lymph nodes.

different names. It is a brilliant and valiant attempt to bring order into a chaotic subject, but there is need for more simplification before it can be accepted and used. My associates and I contemplate using the method of tissue culture in an investigation of the lymphomatous tumors, since it has thrown considerable light on the cellular origin of other neoplasms, but it will probably be several years before our efforts can bear fruit.

Meanwhile, those concerned with the treatment of lymphosarcoma feel the need of names that can be easily recognized and used. There are three terms commonly employed: lymphocytic cell type, reticulum cell type and giant follicle type. Evidently there is no agreement about the first two, for while Warren and Picena⁷ found only 3.6 per cent reticulum cell sarcomas among 308 lymphoid tumors, Sugarbaker and Craver, no doubt guided by Ewing and Stewart, reported 94 per cent reticulum cell tumors among 196 cases. I continue to use these three terms also for convenience. Our criteria, although no doubt inexact, are very simple. We call them tumors of the lymphocytic cell type when the predominant tumor cell is small—only slightly larger than a small lymphocyte. The term reticulum cell type is applied to all lymphosarcomas whose cells are larger than this. The giant follicle tumors are characterized, as the name implies, by the formation of follicles of a size larger than is ever seen in any benign lymphomatous process. Although there is some difference of opinion as to whether this condition is a malignant tumor, the observations of Baehr,⁸ and more recently of Baehr and Klemperer,⁹ are convincing evidence that it is. As will be seen, our own experience coincides with theirs.

During the twenty-one year period 1915-1935 we examined a total of 218 cases of lymphosarcoma with microscopic confirmation of the diagnosis. For 156 of these patients some form of curative therapy was attempted, while for the remaining 62 either curative therapy was not given or it is unknown whether or

not it was given. Ninety of these patients were seen during the sixteen year period 1915-1930, of whom 48 were treated and 42 were not. In the evaluation of results it is our feeling that all cases should be counted as failures unless their survival is known; consequently an analysis of these figures into dead, lost and not followed is omitted.

Table 1 deals with the twenty-one year period and shows the five or more year survivals so far as is known. If all the cases are included, the five year survival rate is 16.5 per cent. But since about one third of these are known to have had persisting disease at five years, the symptom-free survival rate is only 10.5 per cent. In the second and third sections of this table, the gross figures are analyzed into B, those who were treated with roentgen therapy, surgery or a combination of the two, and C, those who received no curative therapy so far as our records show. The five year survival rate for the treated group is 21.8 per cent. Again about one third of these patients are known to have had persisting disease at five years, so that the symptom-free survival rate is 14.8 per cent. Finally, the untreated group had a five year survival rate of 3.2 per cent, but none of these survivors were free from disease.

The second table shows the cases recorded during the sixteen year period 1915 through 1930, analyzed in a similar fashion. Although the percentage rates are smaller, it demonstrates that while there is a survival rate at ten years of 14.6 per cent and 2.4 per cent respectively for treated and untreated patients, it is only the treated group that has symptom-free survivors at ten years.

Further study of these two tables shows some interesting things. Statistically the five year survival rate is better than average if the disease first manifests itself in the cervical, axillary and inguinal nodes, the oral

TABLE 3.—*Cases of Lymphosarcoma Arranged According to Histologic Type*

		5+ Year Survivals		Died or Alive with Tumor After 5 Years		Symptom Free 5+ Years, per Cent
		No.	Per Cent	No.	Per Cent	
All cases						
Reticulum cell.....	89	11	12.1	6	6.7	5.4
Lymphocytic cell....	55	11	20.0	6	10.9	9.1
Giant follicle.....	20	7	35.0	3	15.0	20.0
Total.....	164*	29	17.7	15	9.1	8.6
Treated cases						
Reticulum cell.....	63	10	15.9	5	8.0	7.9
Lymphocytic cell....	41	11	26.8	6	14.6	12.2
Giant follicle.....	17	6	35.3	2	11.8	23.5
Total.....	121	27	22.3	13	10.7	11.6

* In the other 54 cases either slides were no longer available or the preparations were unsatisfactory for accurate typing.

cavity and nasopharynx, the gastrointestinal tract and the skin and orbit, and poorer than average if it starts in the retroperitoneal, mesenteric or mediastinal nodes or the spleen and thyroid or is generalized. Persistence of disease and later deaths, however, narrow the more favored group to the cervical and axillary nodes, the mouth and nasopharynx and the gastrointestinal tract.

A second striking observation comes from a comparison of the treated and untreated patients. Whereas in the treated group 21.8 per cent survived five years and 14.8 per cent were symptom free, in the untreated

6. Robb-Smith, A. H. T.: Reticulosis and Reticulosarcoma: A Histological Classification, *J. Path. & Bact.* **47**: 457 (Nov.) 1938.

7. Warren, Shields, and Picena, J. P.: Reticulum Cell Sarcoma of Lymph Nodes, *Am. J. Path.* **17**: 385 (May) 1941.

8. Baehr, George: The Clinical and Pathological Picture of Follicular Lymphoblastoma, *Tr. A. Am. Physicians* **47**: 330, 1932.

9. Baehr, George, and Klemperer, Paul: Giant Follicle Lymphoblastoma, Benign Variety of Lymphosarcoma, *New York State J. Med.* **40**: 7 (Jan. 1) 1940.

group only 3.2 per cent survived more than five years and none were free from disease. In the older group the ten year survivors of treatment were 14.6 per cent total with 12.5 per cent symptom free, while only 1 untreated patient survived ten years before dying of the disease. It may be objected with justice that the composition of the treated and untreated groups is different and not properly comparable, but it cannot be gainsaid that there are symptom-free survivors at five and ten years in the treated groups and none in the untreated groups.

Our experience parallels that of Sugarbaker and Craver with respect to age. Of the 36 long survival cases 1 was under 20 years. This was a boy of 13 with giant follicle lymphosarcoma of the cervical nodes who was well sixty-one months after radiotherapy. Of the rest, 4 were in the third decade, 4 in the fourth and the other 27 were 40 years or older. No patient who has survived ten or more years was in the first three decades of life when first treated.

Six of our patients with lymphosarcoma died eventually with leukemia. The most interesting of these had a giant follicle lymphosarcoma of the inguinal lymph nodes treated by excision and radiotherapy. She also had a carcinoid of the appendix removed and finally died ninety-one months after excision of the inguinal nodes with lymphatic leukemia. This was the only time

TABLE 4—Type of Treatment Used in Cases of Lymphosarcoma with Long Survival

	Number *	Per Cent
Radiotherapy alone.	10 (4)	52.5
Excision and radiotherapy	8 (2)	22.2
Excision alone	7 (1)	19.4
Biotherapy alone	2 (1)	5.6
Total	27 (8)	100.0

* Figures in parentheses are ten year survivals

that I have seen giant follicle lymphosarcoma associated with leukemia.

Sugarbaker and Craver expressed the opinion that histologic examination did not help in prognosis except in giant follicle lymphosarcoma, which has a much longer average duration of life than any other kind. Since almost all their cases were classified as reticulum cell sarcomas, this is easy to understand. Using the simple criteria already described, table 3 shows that in our cases there is a definite difference between the three types in absolute and symptom-free survival rate. The reticulum cell group had the greatest number of cases and a survival rate well below the average. Lymphocytic cell tumors are next most frequent with a survival rate about 1 percentage point above the average and the giant follicle tumors with the smallest number of cases show a survival rate about 12 percentage points above the average. I believe, therefore, that the division of the tumors into histologic groups is one factor that may be used with others in statistical prognosis.

Clinically, a majority of the lymphosarcomas seem to have a focal origin. All but 1 of our treated patients who have survived symptom free for more than five years and all of the ten year symptom-free survivors had either a single primary focus or at most two contiguous anatomic areas involved when treatment was begun. The single exception was a woman aged 28 with generalized glandular involvement by a giant follicle

lymphosarcoma. She was treated with roentgen rays and remained symptom free sixty-four months after treatment. This indicates the importance of early diagnosis and is a strong argument in favor of the more frequent use of diagnostic biopsy without procrastination in cases of unexplained localized lymph node enlargements.

Table 4 shows that radiotherapy has been the most frequently used form of treatment. It was the sole form of therapy in half of the long survival cases and was combined with surgery in another quarter. But it is significant that it is possible to have long survivals following surgical removal alone. Six of these cases were symptom free when last seen. Two involved lymph nodes, 3 the gastrointestinal tract and 1 the external canthus of the eye. This suggests that the disease may sometimes remain confined to the vicinity of its focal origin for a sufficiently long time to permit its complete eradication by such a limited procedure as local excision. Finally, the table emphasizes the fact that in rare instances, even if untreated, the disease may pursue an exceedingly slow course lasting many years.

SUMMARY

This study has brought out the fact that in the group of patients observed by us, although 1 patient survived ten years without treatment before dying of lymphosarcoma, there were 7 treated patients who lived that length of time and 6 of them are symptom free. One cannot know that these 6 patients are cured but, on the other hand, it is not justifiable to assume that they are not. The great difference in favor of the treated cases over such a long period of time gives one the right to anticipate that some of these clinical cures may be absolute ones.

The favorable results have been obtained almost always while the neoplasm is still relatively localized. If more cases are recognized and treated in this early stage, the number of cases of long survival will be increased. This means the earlier biopsy of enlarged nodes and suspicious tumors in the known areas of involvement.

Probably because the disease usually has a focal origin, the long symptom-free survivals have followed both radiotherapy and surgery used either alone or in combination. Since lymphosarcoma is generally radio-sensitive, roentgen therapy is usually preferred. If surgery is selected as the primary treatment it is probably better to follow it with roentgen therapy.

There are some factors that may be taken into consideration in the prognosis. Giant follicle tumors are the least malignant and reticulum cell tumors the most malignant of the lymphosarcomas. If the neoplasm manifests itself before the age of 20, the chances of long survival are minute; they are greatest if the patient has passed his fortieth year. Cases associated with leukemia are always fatal. The mouth and nasopharynx, the gastrointestinal tract and the cervical and axillary lymph nodes are more favorable sites of origin, while the spleen, the thyroid, the mediastinum, the retroperitoneal region and generalized lymph node involvement are the least favorable. If the disease has involved more than two contiguous anatomic structures, the chances of symptom-free long survival are very remote. A long survival irrespective of the degree of involvement or of treatment may be expected in between 2 and 3 per cent of all cases.

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NONSPLINTING TREATMENT OF FRACTURES OF THE ELBOW JOINT

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In the treatment of any type of fracture, the first thought that comes to mind is fixation and splinting. Concerning fractures of the elbow joint, however, equal consideration should be given to the concept of non-fixation. That a considerable degree of dysfunction has been the rule rather than the exception with splinting treatment is confirmed by Cohn.¹ He states that "end results in fracture of the elbow are not good." He and others admit that the avoidance of complications such as Volkmann's ischemic contracture, myositis ossificans or ulnar neuritis is easier than treatment of these conditions later.

Deviation from traditional treatment was tried in a series of cases because of the unsatisfactory results obtained in a case at Fort Totten in which an officer sustained a minor fracture of the elbow joint as a result of a fall during a basketball game, with resulting ankylosis and calcification.

REPORT OF CASES

CASE 1.—First Lieutenant A. A., aged 32, was roentgenographed immediately after the accident on Dec. 9, 1939 and films showed (1) simple complete fracture of the extreme tip of the right coronoid process. The multiple small fragments were in fair alignment but separated about $\frac{1}{8}$ inch from the coronoid process itself; (2) simple incomplete fracture of the head of the right radius; the lateral margin of the head was broken into several small fragments, which were displaced toward the hand and laterally approximately $\frac{1}{4}$ inch.

The patient's arm was immobilized at 90 degrees for several weeks by means of a plaster cast. On removal of the dressings, considerable lack of motion was encountered in flexion and extension as well as in supination and pronation. Weight carrying diathermy and massage as well as passive manipulation were instituted. Roentgenograms at this time revealed rather diffuse callus formation in the vicinity of the fracture and a slight amount of calcification in the surrounding soft tissues. Manipulation under general anesthesia, treatment with hot compresses, diathermy and massage produced considerable restoration of motion, and x-ray examination showed fair position and normal callus formation in the fracture area of the coronoid. However, considerable hypertrophy and deformity of the head of the radius were noted. After the pain and swelling had subsided, the patient was encouraged to pursue his usual activities and was told to return several times weekly for further treatment. The elbow appeared to have a normal contour. Although pronation and supination developed normally, restricted motion persisted in this elbow, which prevented extension beyond 120 degrees and flexion to better than 30 degrees. At the time of the August maneuvers, about nine months later, it was noted that the arm was still unimproved.

The basis for a concept of nonsplinting treatment lies in the fact that fractures of the elbow joint itself, involving the joint surfaces, are concerned with fractured bones the fragments of which are comparatively short; and it is difficult to realine them properly for this reason with the use of external mechanical force. And it is even more difficult to hold them in realinement once such primary alignment is attained. Blauvelt² recognizes this problem when he states that "in no joint

in the human body is such a variety of mishaps to the opposing bones possible as in the elbow. And in no part of the body skeleton are fractures followed by more disabling complications than in this region." Buchanan³ also admits that "the uncontrollable short fragment is a problem in accurate reduction and retention. When there is a short fragment near a joint, it is not controllable by external splinting." He advises open operation, with which I do not concur.

The excellent circulation and rather extensive cartilage surface of this joint favors a tendency to ankylosis and calcification when fracture occurs. Even in cases in which the cast or external splint is removed early, achievement of the normal state and normal function is a tedious and often painful process. Since the blocking of the circulation in the joint is one of the most important things to guard against, it seems obvious that a non-fixation type of treatment would be the procedure of choice. Gould⁴ thinks that complications such as Volkmann's ischemic contracture, in which there is more or less sudden transformation of muscles into dense fibrous tissue, result from interference with the venous return from the muscles, while the arterial supply remains intact. He says "The most successful treatment is prevention, and this means avoidance of circular bandages and avoidance of acute flexion in the presence of swelling." Buchanan³ reiterates that "circulatory ease" is essential in healing and suggests that a horizontal or slightly centripetal down slope is the position which will minimize pain and prevent edema, with its vicious circle of circulatory obstruction, fibrosis, and so on. Frost⁵ says "I am not so particular about complete immobilization of fractures in injuries to the elbow. In the early stage, because of the pain and swelling, the patient cooperates nicely in maintaining the injured elbow quite fixed."

In the series of cases to which this new concept of treatment was applied, no fixation was employed by external splints or casts or other measures ordinarily used for immobilization. The fracture or fractures in the vicinity of the elbow joint were maintained in the functionally flexed position by a simple triangular bandage suspended from the neck. Movement of the forearm and arm as well as of the elbow joint was encouraged as soon as possible, in keeping with the painful limits of the injury. A good deal of induration and swelling is precipitated almost immediately after such a fracture, and the application of a cast or external splint would only aggravate this condition and should, I think, be considered a dangerous procedure. Furthermore, the nonfixation treatment permits close observation of the condition of the joint and early treatment of any untoward symptoms and complications.

While many authors⁶ do not consider it advisable to institute active or passive motion for several days or weeks after the injury, I have found that motion of the hand, fingers, forearm and wrist, when encouraged as soon as possible, produced a better functional result and was in line with the universal concept of functional therapy. I agree with Eliason and North,⁷ however,

1. Cohn, Isidore: Personal Observations on Fractures About the Elbow, *J. Oklahoma M. A.* 27:92 (March) 1934.
2. Blauvelt, Hugh: Fractures Around the Elbow Joint, *M. Press* 197:443 (Nov. 16) 1938.

3. Buchanan, Lyle: Fractures Around the Elbow Joint, *M. J. Australia* 2:881 (Dec. 26) 1936.

4. Gould, A. L.: A Neglected Danger in the Treatment of Elbow Fractures, *Maine M. J.* 27:116 (June) 1936.

5. Frost, J. G., in discussion (p. 140) on Bendixen, P. A.: Fractures of the Elbow, *Internat. J. Med. & Surg.* 48:101 (March) 1933.

6. Higgs, S. L.: Fractures in the Region of the Elbow Joint, *Brit. M. J.* 2:230 (July 3) 1938.

7. Eliason, E. L., and North, J. P.: Fractures About the Elbow, *Am. J. Surg.* 44:88 (April) 1939. Reich, R. S.: Early Motion in Elbow Fractures, *Physiotherapy Rev.* 17:7 (Jan.-Feb.) 1937. Roberts, W. M.: Management of Elbow Fractures, *South. Med. & Surg.* 92:8 (Jan.) 1930.

that it is the voluntary, active movement of the patient, which constitutes the major element in recovery. The surgeon may guide movements; he may support the weight of the extremity, but he cannot hasten matters by forcible passive motion or stretching under anesthesia.

The important thing from the patient's point of view is to get as perfect a restoration of function as possible. The anatomic correction, as Frost⁸ says, may be of great importance in the event that a compensation case goes before the industrial commission. It is interesting to note in this connection that many times roentgenograms will show that there is improper anatomic correction, but functionally the result is satisfactory. McKee⁸ humorously describes his mountaineer patients having fractured elbow joints and his trials and tribulations in treating them. He describes devious types of fixing devices he has had to use. Most interesting in relation to this article are 2 cases he recounts in which, because of excessive swelling and edema, he applied no splinting apparatus. The arm was allowed to lie on a pillow at the carrying angle. In both of these cases, he reports, function is 100 per cent. McKee adds "Our results have run the cycle of recovery as truly as has our treatment; some untreated cases have regained 100 per cent function; one much treated case, a 90 per cent dysfunction."

Following is a group of cases of elbow fracture treated at Fort Totten Station Hospital by the non-splinting methods. It has been gratifying to observe that all of these patients regained 100 per cent function:

CASE 2.—Private (first class) J. E. C., aged 22, entered the hospital by ambulance, after having sustained an injury to his left elbow July 2, 1940. He had fallen on the flexed arm while running to catch a bus. His past history was noteworthy for the fact that he had had a broken left arm fifteen years previously. The x-ray examination on admission revealed (1) a comminuted fracture of the lateral condyle with slight displacement upward, laterally and backward, extending through the lateral portion of the capitellum into the joint proper; (2) simple avulsion fracture, medial epicondyle with displacement downward and backward. The fracture was treated by placing the arm in a triangular sling. In less than a week the swelling had receded and the patient could obtain some flexion of the elbow. Two weeks later extension was estimated at two-thirds and flexion at one-half normal and the hand grip was good. On September 26 the patient could fully extend his elbow forcibly while receiving diathermy. When discharged to duty on October 25, extension was approximately 180 degrees and flexion 5 degrees without effort.

CASE 3.—Private R. F., aged 21, was admitted April 18, 1941. His elbow had been injured by a piece of coal (8 by 4 inches) which had been hurled at him by a prisoner while he was acting as guard on duty. He was unable to move his arm at the elbow, and the latter bled profusely. His past history included a broken left wrist eight years previously. The diagnosis was a transverse fracture through the base of the olecranon process of the left ulna, the fragments being in good position. The nonsplinting treatment was instituted and on April 30, 1941 the patient was discharged to duty, cured, with 100 per cent function regained.

CASE 4.—Corporal A. J. L., aged 27, admitted May 4, 1941 from command, while packing equipment prior to transfer was going down a flight of stairs and his heel caught in one of the steps. He felt himself falling and in trying to grasp hold of the side rail he missed his footing entirely and fell the remainder of the distance (about four steps), landing on his right shoulder. There was no immediate pain or discom-

fort, but later the patient found he could not move his right arm while attempting to put on his trousers. He reported to the hospital, where it was found that he had a simple comminuted complete fracture of the right clavicle and a simple comminuted fracture of the olecranon process of the right ulna. His progress was satisfactory on the nonfixation treatment and on June 30, 1941 he was discharged to duty with a good functional result.

CASE 5.—R. E. V., aged 22, admitted on March 26, 1940, was a laborer, transferred from a CCC camp to Fort Totten with a reset left elbow, which he had dislocated when he fell down a gully while carrying brush on March 21, 1940. His elbow was swollen; pronation and supination were normal, flexion and extension severely limited. The diagnosis was simple complete fracture of the epicondyle of the left humerus and simple complete dislocation of the left elbow. Good progress was made on the nonsplinting treatment and he was discharged cured on May 23.

CASE 6.—Private D. G. C. was admitted August 21, 1941 with a history of having injured his elbow on July 24, 1941 while going down a steep embankment; he lost his balance and fell on his arm. The doctor had told him there was nothing broken and to rest his arm. However, the elbow became swollen and discolored three days later. The soldier continued on duty to the best of his ability. He reported to the hospital for reexamination, because his hand was giving him some trouble and on x-ray examination it was found that he had a comminuted fracture through the head of the left radius with no appreciable separation of fragments. There was no evidence of any callus formation. A triangular sling was applied and excellent progress continued until discharge.

COMMENT

While the treatment of elbow fractures herein suggested may be a radical deviation from previously accepted methods, the evidence presented in connection with this new concept of therapy is worthy of consideration. Many authors have hinted at the advisability of less drastic measures (than plaster casts and open operation) in the treatment of fractures about the elbow, but none have mentioned their willingness to dispense with the old methods of splinting and other forms of fixation. In certain types of these cases Vernon⁹ advocates the application of a modified triangular sling, which he describes in detail; but he mentions that it must be used cautiously and with reservation. It is my opinion that the nonfixing type of treatment in fractures of the elbow may be applied in all cases with profit and with greater restoration of normal function and should be the rule, with fixation and splinting the exception.

This method of treatment may be applied to children as well as to adults.

CONCLUSIONS

1. Since the fractured segments in fractures of the elbow are not long enough to be manipulated in reduction, the nonfixing methods should be the treatment of choice.

2. Interference with the circulation about the elbow, brought about by the application of plaster casts, tight bandages, and the like, is responsible for many of the complications and the high degree of dysfunction resulting from the fixating treatment.

3. Greater restoration of function was attained by this method in the series of cases presented.

4. The method may be used in the treatment of children as well as of adults.

8. McKee, T. K.: Fractures Around the Elbow Joint in the Hands of the General Practitioner, *Virginia M. Month.* 60: 102 (May) 1933.

9. Vernon, Sidney: Modified Sling for Fractures About the Elbow, *Am. J. Surg.* 23: 555 (March) 1934.

Clinical Notes, Suggestions and New Instruments

SULFADIAZINE IN LYMPHOGRANULOMA VENEREUM OPHTHALMITIS

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Infection of the eye by the virus of lymphogranuloma venereum is an unusual condition, as judged by reports in the literature. Four reports of cases are reviewed by Curth and his associates,¹ who add 1 case which was first presented by Hopkins;² this was a case of chronic involvement, with loss of vision, which was cured by the administration of sulfanilamide.

In this paper a case of acute involvement is presented in which treatment by administration of sulfadiazine was successful, with no sequelae.

B., a man aged 40, a laboratory worker previously in good health and with no history of lymphogranuloma venereum,

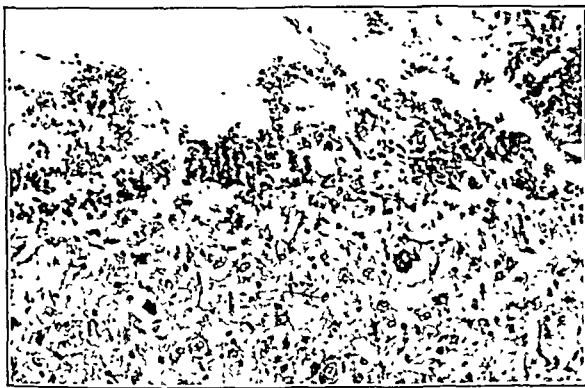


Fig. 1.—Section of mouse brain showing inflammatory reaction in fourth ventricle; $\times 140$.

first noticed an irritation of the left eye about March 7, 1941. The complaints were a feeling of "sand under the lids" and watering of the eye. There was moderate injection of the conjunctival vessels. The condition was regarded as a simple conjunctivitis and was treated by washing occasionally with boric acid solution. The inflammatory condition slowly increased in severity and a mucoid discharge of the eye began to appear. The patient was referred to an oculist on March 20. Examination at that time showed vision of 20/20 in each eye and conjunctivitis of the left eye of moderate severity. The lids on eversion showed more congestion than the bulbar conjunctiva and presented many bleblike papules which suggested the possibility of trachoma. Slit lamp examination showed the aqueous humor to be clear and the vessels at the limbus not penetrating the cornea. Smears of the conjunctival scrapings were made but no organisms were found.

Treatment at first consisted of hot boric acid compresses every two hours and azosulfamide drops in the culdesac three times a day; dark glasses were worn and use of the eyes was restricted. The patient was observed every few days. On

March 31, since there was no appreciable change for the better, the azosulfamide was discontinued and 0.2 per cent zinc sulfate 1 drop three times a day substituted.

On April 2 slit lamp examination revealed a beginning keratitis, with a few keratotic precipitates near the limbus. A search for foci of infection, including roentgenograms of the teeth

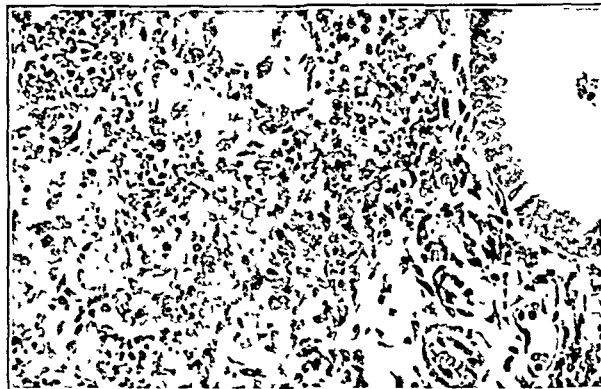


Fig. 2.—Section of mouse lung, pneumonic area; $\times 285$.

and sinuses, examinations of the urine and prostate and a general medical check revealed nothing of positive significance. A course of intramuscular foreign protein therapy was begun. On April 4 the keratitis seemed slightly worse and a small marginal corneal ulcer at 12 on the clock dial had developed.

At this time, since the condition had gradually increased in severity in spite of continued therapy and owing to the absence of definite bacteriologic findings, it was considered that the patient might have been infected with some virus with which he had had contact in the laboratory. The virus of lymphogranuloma venereum seemed most probable, and mice were inoculated intracranially with a washing of physiologic solution of sodium chloride of the eye on April 4. The patient was then given a mydriatic and treatment was continued.

The inoculated animals remained apparently healthy until April 17, when 3 of the 5 inoculated showed signs suggestive of infection with the virus of lymphogranuloma venereum such as humping of the back, rough coat, lethargy, ataxia and slight ocular discharge.

When it seemed that the diagnosis was established, therapy was begun, on April 17, with sulfadiazine (Lederle), which had previously been found effective against the experimental infection in mice. The dose was 1 Gm. by mouth three times a



Fig. 3.—Section of mouse lung showing accumulation of "elementary bodies" in a vacuole in pneumonic area; $\times 1,500$.

day after meals. Up to the time this treatment was begun the condition of the eye had shown no change for the better, but after treatment with sulfadiazine there was a definite, progressive improvement until April 28, at which time the eye was perfectly clear (vision 20/20) and the patient was discharged from treatment. He had received 1 Gm. of sulfadiazine three

From the Division of Infectious Diseases and the Division of Pathology of the National Institute of Health, Bethesda, Md., and the Relief Station, Washington, D. C.

1. Curth, Wilham; Curth, Helen O., and Sanders, Murray: Chronic Conjunctivitis Due to the Virus of Venereal Lymphogranuloma, *J. A. M. A.* 115: 445 (Aug. 10) 1940

2. Hopkins, J. G.: Chronic Conjunctivitis of the Right Eye, Probably Due to the Virus of Lymphogranuloma Venereum, *Arch. Dermat. & Syph.* 39: 742 (April) 1939.

times a day for five days, followed by a rest period of three days, at the end of which time a second course of the drug was started. In all, 30 Gm. was given. Recovery was considered complete on April 28, ten days after this therapy was first begun.

Following recovery a Frei test was done and the reaction was interpreted as positive; a wheal 8 mm. in diameter, surrounded by an area of erythema, developed. The reaction did not subside completely until about ten days later. Serum was also obtained and a complement fixation test was done by Dr. G. W. Rake of the Squibb Institute, who reported positive complement fixation in a serum dilution of 1:60, which was the highest dilution tested.

The virus was maintained without difficulty by serial passage of infected mouse brains at three to four day intervals; it was also adapted to mouse lung by intranasal inoculation of an emulsion of infected brain in physiologic solution of sodium chloride, resulting in an extensive fatal pneumonia. Examinations of tissue sections showed brain lesions apparently consistent with those reported by Findlay³ and seemingly identical with those found previously in this laboratory in studies of two different strains of virus of lymphogranuloma venereum. The pulmonary lesions appeared to be the same as those reported by Shaffer, Rake and McKee⁴ as characteristic of this virus.

SUMMARY

A patient with probable accidental infection of the eye with the virus of lymphogranuloma venereum was successfully treated by the administration of sulfadiazine.

THROMBOPENIC PURPURA DUE TO SULFATHIAZOLE

SAMUEL ROSENFELD, M.D., AND FREDERIC FELDMAN, M.D.
BROOKLYN

Thrombopenic purpura has been observed and described as a manifestation of drug toxicity during the administration of sulfanilamide¹ and of sulfapyridine.² It has yet not been reported with the use of sulfathiazole. The following case is one in which this complication occurred.

REPORT OF CASE

History.—A carpenter aged 37 was admitted to the Jewish Hospital Sept. 11, 1941. He had experienced left renal colic seventeen years before and a calculus was removed from the urinary bladder by cystoscopy. Three years later a similar episode occurred. The patient then experienced good health until one year before admission, at which time he again had left renal colic. A nephrostomy was performed at another hospital but the patient did not know whether a calculus was removed. The wound healed and the patient was comfortable for the next three months. For nine months prior to admission he had frequent attacks of pain in the left flank, becoming severe three days before admission and radiating to the back. In addition, he had fever and frequency of urination with dysuria and pyuria.

The family history was irrelevant. In the past history the occurrence of scarlet fever and two operations for hernia were noted. There was no history of venereal disease. He never had hemorrhagic manifestations. He had taken plenty of orange juice in his daily dietary.

3. Findlay, G. M.: Experiments on the Transmission of the Virus of Climatic Bubo to Animals, Tr. Roy. Soc. Trop. Med. & Hyg. 27: 35-66 (June) 1933.

4. Shaffer, M. F.; Rake, Geoffrey, and McKee, Clara M.: Agent of Lymphogranuloma Venereum in the Lungs of Mice, Proc. Soc. Exper. Biol. & Med. 44: 408 (June) 1940.

From the Department of Laboratories, Division of Hematology, and the Department of Urology of the Jewish Hospital.

1. Hageman, P. O., and Blake, F. G.: Clinical Experience with Sulfanilamide in the Treatment of Beta Hemolytic Streptococcal Infections, Am. J. M. Sc. 195: 163 (Feb.) 1938. Chemotherapy for Infectious Diseases and Other Infections (Table of Manifestations of Toxicity), Circular Letter No. 81, J. A. M. A. 116: 513 (Feb. 8) 1941.

2. Russell, H. K., and Page, R. C.: Thrombocytopenic Purpura Due to Sulfapyridine, Am. J. M. Sc. 200: 495 (Oct.) 1940. Chemotherapy for Infectious Diseases and Other Infections.

Physical Examination.—On admission the temperature was 104.4 F., the pulse rate 90 and the respiratory rate 30. The skin and the mucous membranes appeared normal. The heart and lungs were normal. The systolic and diastolic pressures were 110 mm. and 60 mm. of mercury respectively. Abdominal examination showed a definitely tender mass in the left flank (presumably kidney), moving freely with respiration. There was severe left costovertebral tenderness. The edge of the liver was felt two fingerbreadths below the right costal margin. The spleen was not felt. The prostate gland was not enlarged or tender.

Laboratory Studies.—A catheterized specimen of urine on admission was normal microscopically and tests for albumin and sugar gave negative results. Culture yielded *Proteus vulgaris*. The blood urea was 16.5 mg. per hundred cubic centimeters and five days later it was 9.8 mg.; blood uric acid was 4 mg., calcium 8 mg., phosphorus 3.5 mg. and phosphatase 2.4 units per hundred cubic centimeters. The Kline test gave negative results. Blood culture was sterile. An intravenous phenolsulfonphthalein test showed 37.5 per cent of dye recovered after one and one-half hours. Intravenous urography revealed that the right kidney functioned normally. In the left ureter was a large calculus just above the ureterovesical junction measuring about 3 cm. in its long diameter. The left kidney appeared larger than the right but failed to excrete the medium.

The blood count on admission was hemoglobin 90 per cent (Haden-Hausser), erythrocytes 4,700,000 and white blood cells 14,000 per cubic millimeter. The blood smears showed 71 per cent segmented and 13 per cent nonsegmented polymorphonuclear neutrophils, 15 per cent lymphocytes and 1 per cent monocytes. Platelets were abundant. The red blood cells showed no abnormalities.

Clinical Impression.—The impression was that there was a left ureteral calculus with ureteral obstruction and pyelonephritis.

Treatment.—The patient was given vitamin capsules (containing vitamins A, B₁, B₂, C and D). Sulfathiazole was administered as follows: 1 Gm. on September 11, 4 Gm. on September 12 and 0.5 Gm. on September 13.

Course.—On September 12 it was noted that the patient's temperature was declining, falling from 105 F. to 100.5 F. On September 13, after the amount of sulfathiazole reached a total of 5.5 Gm., a hemorrhagic state began to develop and the temperature rose to 103 F. He had profuse bleeding from the nose and gums, and hematuria was noted. Numerous hemorrhagic vesicles varying in size up to 1 cm. in diameter appeared on the tongue, lips and buccal mucosa. There was also an extensive petechiasis of the skin and mucous membranes. Extreme pallor developed. The spleen was not palpable and there was no enlargement of the lymph nodes. A blood study showed hemoglobin 50 per cent (Haden-Hausser), red blood cells 2,600,000, white blood cells 12,400 and platelets 2,000 per cubic millimeter respectively. The differential leukocyte count was 57 per cent segmented and 18 per cent nonsegmented polymorphonuclear neutrophils, 10 per cent lymphocytes and 15 per cent monocytes. There was a moderate degree of anisocytosis, poikilocytosis, and polychromatophilia and a slight degree of macrocytosis and microcytosis. Reticulation was 3 per cent. The smears showed an absence of platelets. The bleeding time was six minutes and the coagulation time four minutes. The tourniquet test was strongly positive. Clot retraction time was not done. Sternal puncture revealed 3 per cent myeloblasts, 33 per cent neutrophilic myelocytes, 1 per cent eosinophilic myelocytes, 21 per cent metamyelocytes, 30 per cent nonsegmented and 12 per cent segmented polymorphonuclear neutrophils. Two plasma cells were seen per hundred myeloid leukocytes. The granulocyte-nucleated erythrocyte ratio was 70:30, indicative of an increased erythropoiesis. The erythroblast-normoblast ratio was 30:70, indicative of a moderate delay in maturation. The megakaryocytes were present in goodly number and showed degenerative changes.

Sulfathiazole was discontinued on September 13 at the first appearance of the bleeding. The vitamin therapy was continued and fluids were forced. By September 16 the hemorrhagic phenomena were noted to be waning and the temperature was approaching normal. By September 18 the hemorrhagic vesicles in the mouth and the petechiae of the skin and mucous membranes had entirely cleared and the temperature and pulse had become normal. Blood smears showed the return of platelets in abundance. The bleeding time was less than one minute and the tourniquet test became negative. The hematuria, however, persisted, there being noted the continued presence of red blood cells microscopically. Because of the anemia blood transfusions were given on September 18, September 21 and September 24.

Subsequent Course.—On September 27 a uretrocystolithectomy was performed and a large calculus was removed. The following day, for prophylactic reasons, the administration of sulfathiazole was started again in doses of 1 Gm. three times a day. A total of 15 Gm. was given in five days. There was no recurrence of the thrombopenic episode. On October 3 a blood study showed hemoglobin 74 per cent, 3,600,000 red cells, 9,000 white cells. Platelets numbered 300,000 per cubic millimeter and appeared in abundance in the blood smears. The differential count was 50 per cent segmented and 5 per cent nonsegmented polymorphonuclear neutrophils, 3 per cent eosinophils, 35 per cent lymphocytes and 7 per cent monocytes. The bleeding time was thirty seconds and the tourniquet test gave negative results.

COMMENT

The patient experienced a severe thrombopenic hemorrhagic state during the administration of sulfathiazole. Although the dose was not large (5.5 Gm. over a period of three days), there was no other likely apparent cause for the purpura. There was no history of vitamin C deficiency, and the purpura occurred during adequate administration of vitamin C. There was no uremia. Blood culture ruled out bacteremia. Studies of the blood and bone marrow showed no primary blood dyscrasia. Purpura as the result of a severe intoxication caused by an infection of the urinary tract cannot be absolutely ruled out. However, the toxic state existed before sulfathiazole therapy, and the purpura appeared only after the drug was given.

It should be noted that resumption of the chemotherapy did not cause a recurrence of the purpura. Such an experience is not unusual. Long and Bliss³ cite 2 instances and quote a third of acute agranulocytosis resulting from the administration of sulfanilamide and sulfapyridine in which readministration of the respective drugs failed to reproduce the condition. Failure to reproduce toxic effects on resumption of chemotherapy is also reported with drugs other than the sulfonamides, e. g. mapharsen.⁴

CONCLUSION

The case of thrombopenic purpura described apparently was the result of sulfathiazole medication and seems to be the first of this type due to sulfathiazole to be reported.

NOTE.—Since this report was submitted for publication, our attention has been called to the mention by Kracke⁵ of a case of severe platelet depression, apparently the result of sulfathiazole medication. Purpuric symptoms were not mentioned in this case. There has also appeared the report by Quick and Lord⁶ of a case of acute hemolytic anemia following sulfathiazole administration. In the latter case a purpuric rash was observed, the bleeding time was found prolonged, and the tourniquet test was positive. However, thrombopenia was not reported.

1640 Ocean Avenue—6220 Bay Parkway.

3. Long, P. H., and Bliss, Eleanor A.: The Clinical and Experimental Use of Sulfanilamide, Sulfapyridine and Allied Compounds, New York, Macmillan Company, 1939, p. 284.
4. Rein, C. R., and Wise, Fred: Mapharsen in Treatment of Syphilis in Office Practice, J. A. M. A. 113:1946 (Nov. 25) 1939.
5. Kracke, Roy R.: Diseases of the Blood and Atlas of Hematology, ed. 2, Philadelphia, J. B. Lippincott Company, 1941 p. 443.
6. Quick, E. D., and Lord, F. D.: Acute Hemolytic Anemia Following Sulfathiazole Administration, J. A. M. A. 117:1704 (Nov. 15) 1941.

TOXIC EFFECT OF SULFANILAMIDE ON THE HEMOPOIETIC ORGANS IN A CASE OF POLYCYTHEMIA VERA

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JESS B. SPIELHOLZ, M.D., NEW YORK

An extensive literature has accumulated¹ reporting the toxic effects of sulfanilamide on the blood forming organs. These reactions consist of acute hemolytic anemia with leukocytosis, occasionally a leukemoid blood picture,² severe leukopenia with granulocytopenia and thrombopenia with hemorrhagic phenomena. Such deviations may occur singly or in combination. The outcome occasionally has been fatal.³ The cases reported up to the present time usually have presented initially a normal hemoglobin and red cell count or slightly diminished values. A careful search of the literature fails to disclose any reference

TABLE 1.—Peripheral Blood Studies from the Onset of Illness and After Recovery

Date	Hemo- globin	Red Blood Cells	Leuko- cytes	Staff Cells	Seg- mented Cells	Lym- pho- cytes	Mono- cytes	Eosino- phils	Baso- phils
2/19	110	5,240	17,400	17	64	19	..	..	..
3/6	90	.....	7,000	4	51	42	3	..	..
3/9	67	3,390	1,600	..	7	93	..	..	..
3/10	70	3,700	3,400	..	..	93	7	..	..
3/11	..	.....	4,000	3	..	91	6	..	..
3/15	88	3,920	23,300	..	85	15	..	..	..
3/28	89	4,200	14,400	..	81	19	..	..	..
4/9	72	3,690	19,000	..	83	17	..	..	..
4/11	64	3,190	.....	..	..	..	..	..	..
4/16	82	4,160	.....	..	..	..	..	..	..
10/4	104	6,600	10,000	1	66	22	8	2	1

TABLE 2.—Bone Marrow Studies on March 9 and on October 4

On March 9, during the agranulocytic phase, total count 4,000; showed marked hypoplasia with normal erythropoiesis, maturation arrest of granulocytes at metamyelocytic stage

Bone Marrow Recovery									
Date	Total Count	Myeloblast	Promyelocytes	Neutrophilic Myelocytes	Eosinophilic Myelocytes	Metamyelocytes	Nonsegmented Cells	Segmented Cells	Lymphocytes
10/4	84,800	1	5	11	4	23	17	28	3
									Monocytes
									Eosinophils
									Normoblasts Per 100 White Blood Cells
									43

to a case of polycythemia vera in which there was a toxic reaction of the blood in the course of the administration of sulfanilamide. The following is the report of a case of polycythemia vera and prostatic infection in which anemia, severe leukopenia and neutropenia developed as the result of the administration of sulfanilamide.

A white man aged 61, born in Germany, the owner and manager of a cold storage establishment, was first seen by one of us (J. L.) in 1937. His chief complaints were headaches and vertigo. The patient was obese and of the plethoric type; he had considerable congestion of the conjunctivas and the characteristic plum red color of the buccal mucosa. The heart and lungs were normal. The blood pressure ranged between 160 and 180 systolic and 90 diastolic. The liver and spleen

Read before a meeting of the Graduate Fortnight at the New York Medical College, Flower and Fifth Avenue Hospitals in October 1940.

1. Kolmer, J. A.: Progress in Chemotherapy of Bacterial and Other Diseases, with Special Reference to the Protosols, Sulfanilamide and Sulfapyridine, Arch. Int. Med. 65:671 (April) 1940. Long, P. H.; Haviland, J. W.; Edwards, Lydia B., and Bliss, Eleanor A.: The Toxic Manifestations of Sulfanilamide and Its Derivatives, J. A. M. A. 115:7 (Aug. 3) 1940.

2. Harvey, A. M., and Janeway, C. A.: Development of Acute Hemolytic Anemia During the Administration of Sulfanilamide, J. A. M. A. 109:12 (July 3) 1937.

3. Sheckel, H. A., and Price, A. E.: Fatal Granulocytopenia Following Administration of Sulfanilamide, J. A. M. A. 112:823 (March 4) 1939.

were not palpable. The neurologic examination was negative. A blood count showed hemoglobin 125 per cent, red blood cells 6,700,000, white blood cells 12,000; differential count normal, cell volume 54 per cent and blood volume 120 cc. per kilogram of body weight. A diagnosis of polycythemia vera was made; he was put on a meat-free diet, phlebotomy was occasionally done and the patient obtained symptomatic relief.

In 1938 the patient had a typical attack of coronary thrombosis with positive electrocardiographic tracings. He was confined to bed for six weeks, after which he remained comfortable until the onset of his present illness. On Feb. 18, 1940, he complained of sore throat, his temperature was 103 F. for one day and there was evidence of pharyngitis. Fever recurred five days later and was intermittent for two days. Rectal examination disclosed a tender fluctuating left lobe of the prostate. A diagnosis of prostatic abscess was made. The patient appeared to be acutely ill and was hospitalized. On admission the blood count showed hemoglobin 110 per cent, red blood cells 5,240,000 and white blood cells 17,400 with 81 per cent neutrophils. For the first time urinalysis revealed sugar four plus. On February 26 the patient was found to be in uremia with a blood nonprotein nitrogen of 90 mg. A retention catheter was introduced and intravenous saline infusion given, with considerable improvement. Because of fever, ranging between 101 and 102 F., and the presence of large amounts of pus in the urine, sulfanilamide was administered. In all 33 Gm. was given by mouth and clysis between February 28 and March 6, during which time the temperature continued to fluctuate. On March 6, the hemoglobin level dropped to 90 per cent, and the white blood cell count was 7,000 with 60 per cent neutrophils. On March 9 there was a sudden rise in temperature to 104 F. with a blood count of hemoglobin 67 per cent,

trose, with gradual improvement in the blood picture (tables 1 and 2). Following this, his general condition improved, but his urinary symptoms persisted.

Because of dysuria and urinary retention it was deemed advisable to do a prostatectomy. On March 26, suprapubic

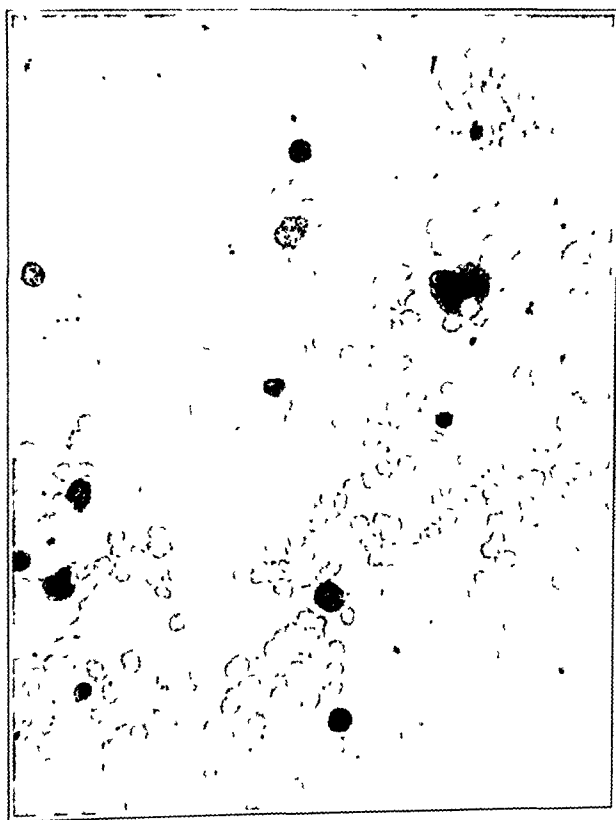


Fig. 1.—Bone marrow in the leukopenic phase, showing aplasia and absence of granulocytes beyond the metamyelocytic stage.

red blood cells 3,390,000; white blood cells 1,600, and 93 per cent lymphocytes. Chemotherapy was discontinued immediately. Aspiration of sternal marrow was done at this time. The total count of marrow material was 4,000 per cubic millimeter. The patient was given two transfusions and intravenous dex-

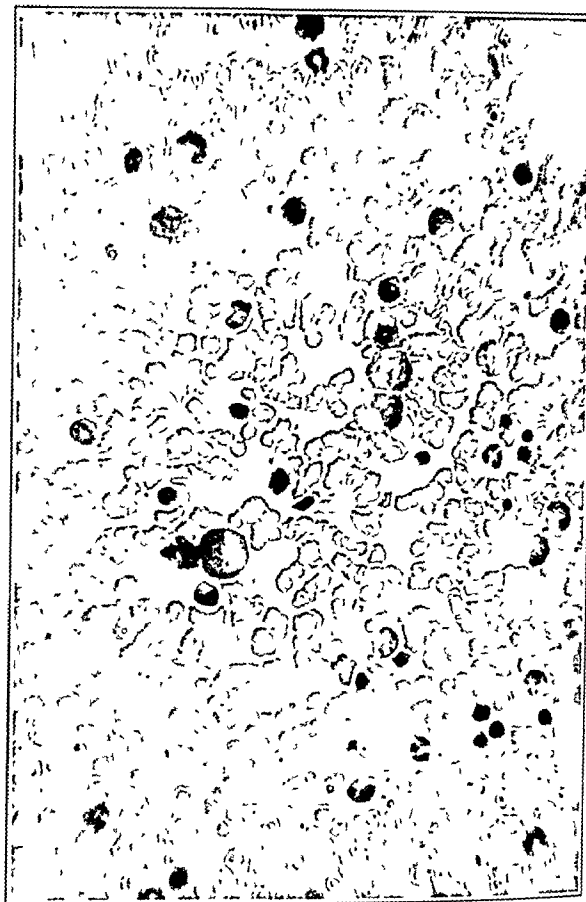


Fig. 2.—Bone marrow after recovery, showing granulocytes in all stages of development.

cystotomy and vasectomy was done. On April 2 the second stage of the operation was performed. Pathologic examination of the prostate showed the presence of an abscess in the left lobe. The patient made an uneventful recovery. Postoperatively leukocytes numbered 19,000 with 83 per cent granulocytes. However, the hemoglobin level dropped to 64 per cent and the red blood cells to 3,190,000, and it was thought advisable, because of failure to respond to iron therapy, to give a blood transfusion of 500 cc. The hemoglobin level then rose to 82 per cent and the red blood cells to 4,160,000. The patient was discharged nine weeks after admission. Blood and bone marrow studies six months later showed a return to high levels

COMMENT

This case illustrates the importance of making frequent blood counts during the administration of the sulfonamide drugs, in spite of the presence of polycythemia. Although the anemia in this case was not as severe as may be seen in cases in which there is initially a normal count, there was a decline of the level of hemoglobin from 110 to 67 per cent and of the red blood cells from 5,240,000 to 3,700,000. There was also severe leukopenia (1,600 leukocytes with 93 per cent lymphocytes). The bone marrow at this stage was aplastic, with a complete maturation arrest at the metamyelocytic stage (fig. 1); such a condition of the bone marrow usually forebodes a bad prognosis. Here, fortunately, both the anemia and the granulocytopenia responded to transfusion. After recovery the peripheral blood counts returned to the original high values and the bone marrow showed its usual cellularity (fig. 2).

The high degree of lability of the bone marrow, and the occurrence of aplasia resulting from infections, allergic reactions, infiltrations and drugs is well known. It would be interesting to speculate, in this case, whether the hyperplastic marrow of a polycythemic patient possesses an unusual reserve for hemopoietic activity. Perhaps this offered a greater margin of safety and greater recuperative powers of the bone marrow from toxic effects following the administration of the sulfanilamide. This does not hold true in the rapidly developing anemia in polycythemia vera following the administration of phenylhydrazine. Here of course the accumulative action of the drug is also of prime importance. It will be interesting to note the effects of the sulfonamides on more patients with polycythemia and infection. The treatment that seems to give the best results is blood transfusion to correct both the anemia and the leukopenia

SUMMARY

A patient with polycythemia vera had toxic reactions from sulfanilamide on the bone marrow and peripheral blood, with anemia, severe leukopenia and neutropenia. In spite of the severe aplasia of the bone marrow and the peripheral blood picture of agranulocytosis, recovery followed blood transfusions.

110 East Thirty-Sixth Street

MORBILLIFORM ERUPTION FOLLOWING USE
OF SULFAGUANIDINE

ROBERT TURELL, M.D., AND WILLIAM LEIFER, M.D.
NEW YORK

The occurrence of dermatitis following sulfaguanidine therapy has apparently not yet been recorded. This report deals with a patient who had a generalized morbilliform eruption which appeared about sixteen days after the institution of sulfaguanidine therapy but who had previously been treated with sulfanilamide, sulfathiazole and sulfadiazine without cutaneous complications.

REPORT OF CASE

A white woman aged 40 was first seen on Jan. 21, 1941 at which time a diagnosis of nonspecific ulcerative colitis was made. One week later she was sent to the Mount Sinai Hospital where 1 Gm. of sulfathiazole in suspension was given every four hours by rectum. After a total of 42 Gm. had been administered there was only a trace of sulfathiazole in each 100 cc. of blood. The patient, however, made a good temporary recovery, as evidenced by the clinical course and sigmoidoscopic studies. Because of a recurrence of the colitis, the

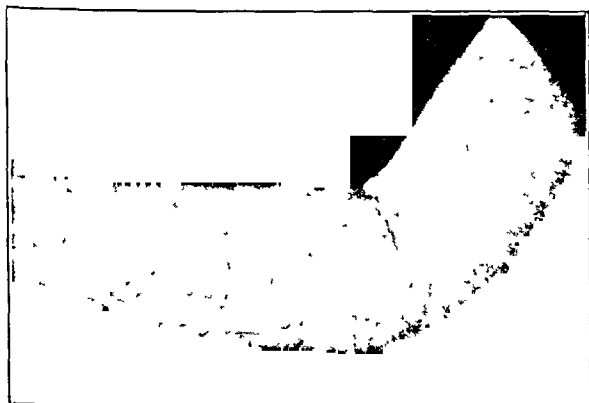


Fig 1—Appearance of cutaneous eruption of forearm

patient reentered the Mount Sinai Hospital on April 28. During this admission the patient received 50 Gm. of sulfathiazole in suspension by rectum. Because of the persistence of the hemorrhagic, edematous and granular appearance in the lowest 5 cm. of the terminal bowel, 100 cc of 1 per cent aqueous solution of sulfanilamide was administered rectally every six hours for

a period of four days. The concentration of sulfanilamide in the blood varied from 2.4 to 43 mg. per hundred cubic centimeters. Sulfathiazole 4 Gm. daily was subsequently given orally for a period of eight days (May 17 to May 24). During this time the hemoglobin values dropped from 90 to 70 per cent

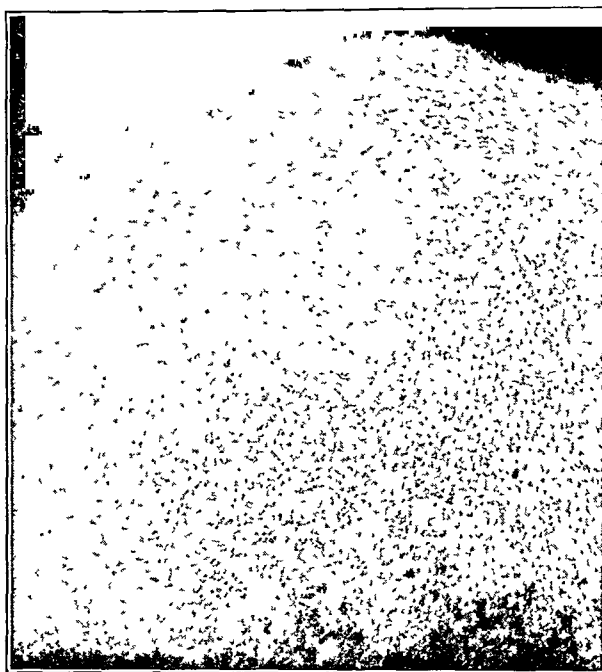


Fig 2—Appearance of lesions on back.

(Sahli). No other deleterious effects had been noted as a result of the chemotherapy. From June 21 to July 8 the patient was given sulfadiazine tablets,¹ 0.5 Gm. each, five times daily without any untoward effects. Because of mild recurrence of bleeding and diarrhea on August 11, sulfaguanidine 3 Gm. daily was given orally for seven days, after which time the dose was increased to 4 Gm. daily and was continued until August 27 (a period of sixteen days). At this time a temperature of 101 F. and a "measly rash" developed. Examination revealed a macular eruption resembling measles and involving the entire body except the face. The dermatitis was most severe on the abdomen, chest, back and forearms (figs. 1 and 2). The lesions varied in size from 2 to 10 mm., were pink to rose, dry, nonscaly and noninfiltrating; they were either not elevated or imperceptibly raised and disappeared on pressure. The rash disappeared within five to six days after the discontinuance of sulfaguanidine.

COMMENT

The occurrence of a dermatitis following sulfaguanidine therapy is of interest because the patient had received other sulfonamides previously without the precipitation of a cutaneous complication. The influence of sunlight can be ruled out because the patient was asked to avoid exposure to the sun's rays whenever the sulfonamides had been prescribed and because the eruption was generalized. The character of the rash herein described resembled the morbilliform toxicoderma occurring after the administration of the sulfonamides and other drugs. The conjunctivas and scleras of our patient were uninvolved.

SUMMARY

In the instance of morbilliform eruption following sulfaguanidine therapy here reported the cutaneous complication did not follow administration of sulfanilamide, sulfathiazole or sulfadiazine, which had been given prior to the institution of sulfaguanidine therapy.

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1. Supplied by Dr. D. A. Bryce, Lederle Laboratories, Inc.

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SATURDAY, MARCH 21, 1942

TONSILLECTOMY AND POLIOMYELITIS

The limited occurrence of the paralytic form of poliomyelitis, when contrasted with the widespread dissemination of the virus, suggests that certain factors may exist which determine whether clinical or sub-clinical disease will result following infection. The occurrence of the bulbar type of the disease after tonsillectomy is an instance of such an additional factor. According to Aycock this involves autarcesis of the host rather than immunity to the virus. The relationship between tonsillectomy and acute anterior poliomyelitis was reported by Sheppard in 1910 and by Ayer in 1928, and it has been reported in more extensive recent observations by Aycock and Luther, Silverman, Stillerman and Fischer, Top and Vaughan and others. Stillerman and Fischer¹ found that tonsillectomy and adenoidectomy had been performed on 10 of 686 patients in a New York epidemic during the month antedating their illness; 6 of the 10 had the bulbar form of the disease. Fischer, Stillerman and Marks² found in their study of the Toronto epidemic of 1937 that acute poliomyelitis developed more often among children between the ages of 3 and 12 years in those recently tonsillectomized than in others. The increased incidence was due entirely to the excess of cases of the bulbar form. Among the children with poliomyelitis the incidence of the bulbar form was twice as great in those whose tonsils had been removed at any time previously as in those with tonsils intact. Analysis of the Detroit epidemic of 1939 by Top and Vaughan³ revealed that for all forms of poliomyelitis the percentage with a history of tonsillectomy at some previous time is higher among patients with polio-

myelitis than among the controls in the same areas. Furthermore, whereas bulbar paralysis developed among 4.2 per cent of nontonsillectomized patients, its incidence among patients previously tonsillectomized was 27 per cent.

Aycock,⁴ after analyzing the available data, points out that the less common bulbar form predominated in the combined statistics over the spinal form in a ratio of about 5:1 in the cases occurring within thirty days following tonsillectomy. In the thirty to sixty day period after tonsillectomy spinal cases were in the ascendency in the same proportion as they exceed bulbar paralysis in general. The incubation period of poliomyelitis in man is represented by a specific interval of from seven to fourteen days. The concentration of bulbar cases following tonsillectomy in the thirty day group at the specific interval of seven to twenty-one days, as compared with the random distribution of bulbar cases in the thirty to sixty day group and the spinal cases throughout the whole period, constitutes, Aycock believes, a strong indication that the occurrence of the bulbar cases in the thirty day group is specifically related to the operative procedure. In all age groups the percentage of cases which are bulbar was significantly higher in tonsillectomized than in nontonsillectomized persons. Nonparalytic poliomyelitis occurred in the two groups with the same frequency as the bulbar and spinal forms combined. These data suggest that removal of the tonsils is not a determinant between nonparalytic and paralytic poliomyelitis but rather between the bulbar and spinal forms of the paralytic disease.

The high proportion of cases of the bulbar form of poliomyelitis which occur shortly after tonsillectomy is paralleled by Sabin's⁵ experiments on monkeys. Sabin observed that mere transitory contact between the normal or injured pharynx or tonsils of monkeys and the virus of poliomyelitis is not enough to produce the disease. However, injection of moderate amounts of virus into the tonsillopharyngeal region produced poliomyelitis in 16 out of 20 monkeys; 13 of these developed the bulbar type of the disease. Of 12 monkeys inoculated intracutaneously or subcutaneously (abdomen) with the same amount of virus, none contracted the disease. These tests show how much more susceptible is the tonsillopharyngeal region. Sabin concluded that the virus progressed along the local peripheral nerves to reach the nuclei of the cranial nerves. The selectivity observed in the occurrence of bulbar poliomyelitis following tonsillectomy in man and its relatively more frequent occurrence in

1. Stillerman, Maxwell, and Fischer, A. E.: Acute Bulbar Poliomyelitis Following Recent Tonsillectomy and Adenoidectomy, *Am. J. Dis. Child.* 56:778 (Oct.) 1938.

2. Fischer, A. E.; Stillerman, Maxwell, and Marks, H. H.: Relation of Tonsillectomy and of Adenoidectomy to the Incidence of Poliomyelitis, *Am. J. Dis. Child.* 61:305 (Feb.) 1941.

3. Top, F. H., and Vaughan, H. F.: Epidemiology of Poliomyelitis in Detroit in 1939, *Am. J. Pub. Health* 31:777 (Aug.) 1941.

4. Aycock, W. L.: Tonsillectomy and Poliomyelitis, *Medicine* 21:65 (Feb.) 1942.

5. Sabin, A. B.: Experimental Poliomyelitis by the Tonsillopharyngeal Route, *J. A. M. A.* 111:605 (Aug. 13) 1938.

tonsillectomized persons suggests that the nasal pharyngeal mucosa is particularly vulnerable and may contain some additional factor which determines the outcome of exposure to the virus. Since tonsillectomy is practically always selective as to time, it would appear desirable to have it performed during the season which does not coincide with the prevalence of poliomyelitis. This measure would probably eliminate a number of cases of the grave and highly fatal bulbar form of the disease.

THE SANITATION OF EATING UTENSILS

An immense increase in travel by rail, ship, plane and motor car and the urbanization of the population have induced millions of people to eat often away from home. The sanitary control of public eating and drinking establishments is an important public health problem.

In fifty-five eating places in Providence, R. I., the methods of dishwashing and the presence on eating utensils of various organisms were investigated.¹ Controlled laboratory experiments were used to determine the requirements for chemical sterilization of glasses with chlorine compounds. An effort was made to educate the managers and employees in the essentials of sanitation and personal hygiene. The investigators visited each establishment twice. They frequently found unclean walls, ceilings and floors, flies in excessive numbers and toilets in poor repair.

The most important single cause of insanitary practices was the abysmal ignorance of managers and employees of accepted sanitary requirements and procedures. The so-called health card required of all employees in these public eating places had degenerated into a mere formality and was without practical significance. The period of exposing eating utensils to hot water or chemical disinfectants was extremely variable and in most instances far too short to insure effective disinfection. The total bacteriologic count was considered a satisfactory index of the sanitary efficiency of methods employed in washing eating utensils. There was no correlation, however, between the high total counts and the presence of specific pathogenic organisms. Hemolytic streptococci, staphylococci and acid-fast bacteria, although they were not identified as *Mycobacterium tuberculosis*, were readily recovered from eating and drinking utensils. *Escherichia coli* and *Aerobacter aerogenes* also were found on some eating utensils. *Staphylococcus albus* was the most frequent contaminant found. The diphtheria bacillus was not readily isolated nor were any of the organisms associated with Vincent's angina.

The use of chlorine compounds for the disinfection of beverage glasses can be an effective method provid-

ing relatively sterile glasses. However, most of the establishments using chlorine disinfection were guilty of gross misuse of this procedure. A concentration of fifty parts per million of available chlorine acting for fifteen seconds was sufficient to cause a reduction of 99.9 per cent in the bacterial counts of beverage glasses artificially contaminated with *Staphylococcus aureus* and *A. aerogenes* when the glasses were freed from organic matter before being immersed in the chlorine solution at a temperature of 59 F. Proof of the relationship between methods of dishwashing and the spread of disease in the community is difficult; nevertheless, any physician who visits eating places during rush periods will occasionally detect obvious evidence of the seriousness of this sanitary defect in public eating and drinking establishments. In these times, attention of managers should be called promptly to such glaring opportunities for dissemination of infection.

ZINC PEROXIDE AND SULFONAMIDES IN THE TREATMENT OF GAS GANGRENE

The inability of anaerobic organisms to multiply in an environment rich in oxygen has been abundantly demonstrated in experiments *in vitro*. The spores of these organisms, while more resistant than the vegetable forms, likewise succumb to oxygen even though they require somewhat higher concentrations. Meleney has demonstrated that this holds true for microaerophilic bacteria. These organisms are capable, after initial cultivation on anaerobic plates, to adapt themselves to the air and to grow aerobically. Therefore, in the treatment of infections produced by anaerobic or microaerophilic organisms an agent capable of liberating oxygen slowly and continuously over a long period is desirable. The experiments of Meleney and his associates both *in vitro*¹ and *in vivo*² demonstrate the effectiveness of zinc peroxide in the treatment of infections caused by these organisms. To be successful, however, the treatment must adhere to the following three principles:

1. The preparation must be active; that is, it must be capable of liberating oxygen when suspended in water or in contact with body fluids. A uniformly active product is now available and has been accepted by the Council on Pharmacy and Chemistry for admission to New and Nonofficial Remedies. It may be used as it comes from the distributors without being sterilized, or it may be sterilized in a dry oven at 140 C. for four hours.

2. The watery suspension (40 per cent) must be applied so that it comes in contact with every part of

1. Horwood, Murray P., and Pesare, P. J.: The Sanitation and Bacteriology of Public Eating Utensils, *Pub. Health Rep.* 57: 33 (Jan. 9) 1942.

1. Johnson, B. C., and Meleney, F. L.: The Antiseptic and Detoxifying Action of Zinc Peroxide on Certain Surgical Aerobic, Anaerobic and Microaerophilic Bacteria, *Ann. Surg.* 109: 881 (June) 1939.
2. Meleney, F. L.: Zinc Peroxide in the Treatment of Microaerophilic and Anaerobic Infections, *Ann. Surg.* 101: 997 (April) 1935.

the invaded surface, which means that in most instances it must be preceded by a wide exposure and débridement.

3. The dressing must be kept wet so that oxygen may be liberated. Meleney states that with zinc peroxide there is immediate disappearance of odor from the wound and subsidence of all signs of inflammation.

Reed and Orr³ have shown in guinea pigs that the introduction of zinc peroxide into wounds inoculated with ten times the lethal dose of *Clostridium welchi*, *Clostridium septicum*, *Clostridium novyi* or *Clostridium sordelli* resulted in a high percentage of recoveries and in a prolongation of the survival time in cases of fatal infection. Almost similar results were obtained by the same authors¹ in guinea pigs from the use of various sulfonamide derivatives placed in the depth of the wound injected with ten times the lethal dose of *Cl. welchi*, *Cl. septicum*, *Cl. novyi* or *Cl. sordelli*. It was found that the concentration of sulfathiazole in the wound remained high for a longer period than was the case with the other derivatives. The relatively stable concentration of sulfathiazole in the infected or potentially infected tissue was probably an important factor in the superiority of sulfathiazole over sulfanilamide or other sulfonamide derivatives. The use of sulfathiazole resulted in 60 per cent recoveries from oral administration and 97 per cent when introduced directly into the infected wound. All untreated animals died of characteristic gas gangrene in an average of twenty-six hours. Even large doses of sulfathiazole, according to these authors, have either no deleterious influence on the normal healing processes of the wound or at most only a transient influence. They regard sulfathiazole as the most suitable drug for the early treatment of gas gangrene or of potential gas gangrene. Hawking⁵ found that application of sulfonamide compounds to the wounds at the same time as insertion of the organisms saved a large portion of the animals infected with *Cl. welchi* or with *Cl. septicum* but that it had only slight influence on infection with *Clostridium oedematiens*. Sulfathiazole was the most successful compound to use in all cases. Local application of sulfathiazole to the wound was more successful in preventing infection than systemic administration by intraperitoneal injection. Delay of two hours in applying the treatment greatly reduced its effectiveness.

The value of sulfonamide derivatives in the treatment of aerobic hemolytic streptococcus, pneumococcus and gonococcus infections has been established. Meleney⁶

notes that these infections are characterized by a relatively long primary stage of cellulitis in which there is no destruction of tissue. The value of these preparations in types of infection in which there is early destruction of tissue is yet to be demonstrated.

Current Comment

EXPERIMENTAL PROCARCINOGENIC EFFECT OF BIOTIN

Attention is drawn once again to biotin and its relation to experimental cancer. The high biotin content of tumor tissue has been discussed recently in these columns.¹ Now the striking report is made² that biotin concentrates and crystalline biotin have a definite procarcinogenic action in rats. The oral administration of the dyestuff butter yellow to experimental animals maintained on a suitable basal diet results in the development of hepatic tumors in a high proportion of cases. Butter yellow incidentally is a dyestuff that is not used to color butter or other foods. The dietary conditions can be so chosen that with butter yellow a 96 per cent incidence of live tumors occurs in one hundred and fifty days. In studies designed to determine the effectiveness of various dietary factors in protecting rats against butter yellow it was observed³ that the addition of riboflavin and of casein to the basal diet gave much protection. The tumor incidence at the end of one hundred and fifty days had decreased from 96 per cent to 7 per cent. This effect, though striking, was not as complete as that obtained by supplements of dried liver or yeast. Accordingly, the influence of the addition of other members of the B complex vitamins was studied. The addition of biotin concentrates or of crystalline biotin to a diet rendered protective against butter yellow feeding by the addition of riboflavin and casein supplements did not result in greater protection but, on the contrary, gave less protection to the animals. In three sets of experiments in which rats were maintained on diets affording a high degree of protection, biotin supplements were found to "break through" the protection. Whereas in the control animals ingesting the protective diet only 1 rat out of 28 developed a liver tumor, the addition of biotin to the same diet in another group of animals resulted in liver tumors in 22 out of a total of 50 animals. These striking results suggest a number of speculative conclusions which may profitably be discussed only when further experimental data are available. The procarcinogenic action of biotin in these studies seems clear. The possibility of producing an opposite effect by a biotin deficiency is of considerable interest. The announcement at this time⁴ of the crystallization of the biotin inactivating protein avidin is most propitious for this line of future investigation.

3. Reed, G. B., and Orr, J. H.: Treatment of Experimental Gas Gangrene with Zinc Peroxide, *War Med.* 2: 79 (Jan.) 1942.
4. Reed, G. B., and Orr, J. H.: Local Chemotherapy of Experimental Gas Gangrene, *War Med.* 2: 59 (Jan.) 1942.
5. Hawking, F.: Prevention of Gas Gangrene Infections in Experimental Wounds by Local Application of Sulfonamide Compounds and by Sera, *Brit. M. J.* 1: 263 (Feb. 22) 1942.
6. Meleney, F. L.: The Important Anaerobic Infections and the Use of Zinc Peroxide in Their Control, *U. S. Nav. M. Bull.* 40: 53 (Jan.) 1942.

1. Biotin in Tumor Tissue, *Current Comment*, J. A. M. A. 117: 622 (Aug. 23) 1941.
2. du Vigneaud, Vincent; Spangler, J. M.; Burke, Dean; Kensler, C. J.; Sugiura, Kanematsu, and Rhoads, C. P.: *Science* 95: 174 (Feb. 13) 1942.
3. Kensler, C. J.; Sugiura, Kanematsu; Young, F. N.; Halter, C. R., and Rhoads, C. P.: *Science* 93: 308 (March 28) 1941.
4. Pennington, Derrill; Snell, E. E., and Eakin, R. E.: *J. Am. Chem. Soc.* 64: 469 (Feb.) 1942.

MEDICINE AND THE WAR

In this section of The Journal each week will appear official notices by the Committee on Medical Preparedness of the American Medical Association, announcements by the Surgeon Generals of the Army, Navy and Public Health Service, and other governmental agencies dealing with medicine and the war, and such other information and announcements as will be useful to the medical profession.

MEDICAL RESERVE OFFICERS HOLDING KEY CIVILIAN POSITIONS

The following memorandum was sent by the Adjutant General's Office on March 2 to all corps area commanders and to the Surgeon General:

1. Medical Reserve officers who occupy key civilian positions fall into two general categories, viz. (a) those in the federal employ and (b) those not in the federal employ.

2. War Department instructions have been published which govern the deferment of reserve officers in federal employ. Under those instructions no reserve officers so employed will be granted deferment beyond March 31, 1942. Those desiring to continue beyond that date in civilian pursuits must tender their resignations from the Officers' Reserve Corps. Reserve officers at present in the War Department Reserve Pool who are federal employees and whose resignations are not accepted prior to April 1, 1942 will be relieved from the War Department Reserve Pool by individual letters from this office.

3. A similar plan will govern the deferment of reserve officers not in federal employ who are engaged in civilian capacity in the medical profession:

(a) Except for those who have not completed one year's internship, no such reserve officer will be granted deferment beyond March 31, 1942. After that date all such officers will be considered available for active duty whenever their services are required.

(b) When it is essential in the interest of the national health or safety that a reserve officer engaged in civilian status in the medical profession should continue in that civilian status, he may tender his resignation from the Officers' Reserve Corps.

(1) Each such tender should be addressed to the Adjutant General, Washington, D. C., attention Reserve Division, and will be accompanied by supporting data establishing the necessity for such resignation.

(2) These supporting data will include a written statement from the appropriate county or state public health official that the continuation of the individual in his civilian occupation beyond March 31, 1942 is considered essential to the public welfare of the county or other appropriate governmental subdivision concerned.

TEMPORARY HOSPITALIZATION FOR CIVILIANS INJURED AS RESULT OF ENEMY ACTION

Temporary hospitalization for civilians injured as the result of enemy action is provided in an agreement announced jointly on March 13 by Administrator Paul V. McNutt of the Federal Security Agency and Director James M. Landis of the Office of Civilian Defense. Financed by special funds allotted to the U. S. Public Health Service by the Federal Security Administrator from funds made available to him by President Roosevelt from his emergency fund, the agreement provides that:

1. In the event of injury to civilians from air raids or other enemy action, all voluntary and governmental hospitals of the nation may serve as casualty receiving hospitals of the Emergency Medical Service. Hospitals will be reimbursed by the federal government for the care of such casualties at established rates.

2. Certain hospitals and other appropriate institutions in "safe areas" are to be designated as emergency base hospitals for reception of casualties or other patients whom it may be necessary to evacuate from casualty receiving hospitals. Those hos-

pitals will also be reimbursed by the federal government at established rates for hospital and medical care. In addition, federally owned medical equipment may be lent to such hospitals, and their medical staffs will be supplemented by physicians of the area, who will be commissioned in the reserve corps of the U. S. Public Health Service.

3. This emergency hospital program will be carried out by the Medical Division of the Office of Civilian Defense in cooperation with the U. S. Public Health Service and the state and local authorities. It was also announced that special sections have been organized in the Medical Division of the Office of Civilian Defense and in the U. S. Public Health Service to carry out the joint program.

Dr. George Baehr, chief medical officer of the Office of Civilian Defense, said that the line of evacuation of hospital populations from cities to the base is to be determined in collaboration with the military and the state evacuation authorities as well as with regional, state and local defense councils.

Dr. Baehr emphasized that the management and control of local casualty receiving hospitals, as well as of emergency base hospitals, will remain the responsibility of the local or state authorities, but all hospitals which admit civilians disabled by enemy action, including sabotage, would be reimbursed. Except for assignment of medical staff and loan of equipment to base hospitals, additional costs will not be a federal responsibility unless authorized in advance, he said.

In establishing emergency base hospitals, emphasis will be placed on the relative safety of the area and the availability of existing hospitals and other suitable institutions to which civilian casualties and other hospital patients could be promptly transferred from urban hospitals in the target areas. Hospitals will be classified on the basis of size, equipment and standards of operation. Surveys of hospital facilities have been under way for some time.

It is proposed to begin immediately the organization of the necessary medical staffs for the base hospitals and to provide for their prompt availability when needed by commissioning them in the reserve corps of the U. S. Public Health Service. These physicians, surgeons, specialists and dentists will receive rank, pay and allowances equivalent to those of the medical corps of the Army. The commissioned officers will be selected from older age groups and from those with physical disabilities which make them ineligible for military service. Women physicians will also be eligible.

The physicians will be selected by regions so that, as far as possible, they may be assigned to service in the regions of the country in which they live. Because they are to function as balanced professional staffs, they will be recruited largely as affiliated hospital units from the staff of civilian hospitals and cleared through the new Procurement and Assignment Service for Physicians, Dentists and Veterinarians.

The following is the text of the agreement between the Federal Security Agency and the Office of Civilian Defense:

AGREEMENT BETWEEN THE FEDERAL SECURITY AGENCY AND THE OFFICE OF CIVILIAN DEFENSE

Subject: Temporary Hospitalization and Medical Care Necessitated by Enemy Action to Civilians.

In an order dated Feb. 6, 1942 the President of the United States allocated funds to the Federal Security Administrator for the following stated purposes:

"to be expended by the administrator of the Federal Security Agency, or through such federal or other agencies as he may designate, for providing temporary aid necessitated by enemy action to civilians, other than enemy aliens, residing in the United States: (1) who are disabled;

(2) who are dependents of civilians who are killed, disabled, interned or reported as missing, or (3) who are otherwise in need of assistance or services. This allocation is not intended to cover civil or other personnel of the federal government for whom other provisions are contemplated."

In order to carry out that part of the order which relates to medical and hospital care, Federal Security Administrator Paul V. McNutt and Office of Civilian Defense Director James M. Landis have agreed that the Federal Security Agency, through the United States Public Health Service, will carry out the following program:

Casualty Hospitals.—All the hospitals in the nation, voluntary and governmental, may serve as casualty hospitals of the Emergency Medical Services established by the Office of Civilian Defense for the care of civilian casualties caused by enemy action. The management and control of such hospitals will not be affected by this plan. Cash payments will be given to such hospitals caring for casualties pursuant to the President's order, at a per diem rate of \$3.75.¹ Any additional costs will not be a federal responsibility unless specifically authorized in advance to meet exceptional circumstances.

Emergency Base Hospitals.—These hospitals will include existing, new or improvised facilities desirably located in "safe areas" outside heavily populated centers and will be used for the care and treatment of civilian casualties and other patients evacuated from urban hospitals because of enemy action.

The Medical Division of the Office of Civilian Defense, in cooperation with the U. S. Public Health Service and state and local medical directors of the Emergency Medical Services, will press for a prompt conclusion existing surveys of such emergency hospital needs and will make recommendation for meeting such needs. Emphasis will continue to be placed on the vulnerability of the area, availability of existing federal, state and local hospital facilities, and other institutions suitable for conversion into emergency base hospitals and the location, number, size and equipment of such hospitals, in order to develop a list to be approved by the Medical Division of the Office of Civilian Defense. The administration of such emergency base hospitals will continue to be a responsibility of state and local authorities. For hospitals which are approved as regards location and otherwise by the Medical Division of the Office of Civilian Defense, federal assistance will be available as follows:

1. A limited amount of hospital equipment will be lent for use in approved emergency base hospitals by the Medical Division of the Office of Civilian Defense. The equipment will remain federal property and will be subject to transfer to other localities or states in accordance with national emergency needs.

2. The medical staff of such hospitals will be supplemented as necessary by physicians including specialists commissioned in the reserve of the United States Public Health Service and assigned, on request, by the Surgeon General thereof.

3. Reimbursement will be made on a per diem basis for temporary care of civilian casualties as above provided for casualty hospitals.

In consideration of the per diem allotment for the care of these patients, it is expected that the hospitals will provide the nursing, technical and subordinate staff and other operating expenses.

Joint effort will be made to obtain assistance under the Community Facilities Act, approved by the President on June 28, 1941, for projects coming within the purview of that act, and of other federal legislation, to supplement existing hospital facilities for the care and treatment of casualties.

Medical Personnel.—Emergency base hospitals for the care of evacuated casualties conceivably may require a large staff of physicians, surgeons and other specialists, including dentists, some of whom must be of high professional caliber. Since such a balanced technical staff cannot be assembled hurriedly in time of need and must be enrolled for future service, as are affiliated general hospital units of the Army, it is proposed to expand the commissioned reserve of the United States Public Health Service for this purpose.

Recruiting will be carried on in collaboration with the Procurement and Assignment Service in accordance with existing agreements. In order not to interfere with the supply of physicians for the Army and Navy, recruitment will be largely from

the older age groups, from physicians with minor physical disabilities which make them ineligible for military service, and from women physicians. Some specialists may be given a consultant status, so as to be available for part time duty.

Other members of the reserve, especially obstetricians, pediatricians, dentists and women physicians, also will be appointed for service in reception areas into which women and children are evacuated.

Nursing and Other Services.—The United States Public Health Service and the Medical Division of the Office of Civilian Defense will cooperate with the American Red Cross, responsible state and local officials, and other organizations in arranging for nursing, technical and other services in emergency base hospitals. The cost of such services will not be federal responsibility.

Field Casualty Service.—In accordance with instructions contained in Medical Division Bulletins 1 and 2 of the Office of Civilian Defense, the responsibility for providing local field casualty services, including the organization of emergency field units, the establishment of casualty and first aid posts, and arrangements for casualty transportation, will continue to be a responsibility of state and local authorities.

Approved: PAUL V. McNUTT. Approved: J. M. LANDIS.
March 2, 1942. Feb. 26, 1942.

APPOINTMENTS BY OFFICE OF CIVILIAN DEFENSE

Dr. John S. Coulter, associate professor of physical therapy, Northwestern University Medical School, Chicago, has been appointed regional medical officer of the sixth Civilian Defense region with headquarters in Chicago. Dr. Coulter was a member of the regular army corps for about ten years and during the first world war commanded a hospital center in Savenay, France. Since his resignation from the Army Medical Corps in 1920 he has practiced medicine in Chicago. He is a member of the Council on Physical Therapy of the American Medical Association and is the author of a book entitled "History of Physical Therapy."

Dr. Dudley A. Reekie, chief medical officer of the Tennessee Valley Authority, Chattanooga, Tenn., has been appointed regional medical officer of the first Civilian Defense region with headquarters in Boston, to succeed Dr. Allan M. Butler of Boston, who resigned to become head of the department of pediatrics at Massachusetts General Hospital. Dr. Reekie, a native of New Zealand who came to the United States in 1920, is a diplomate of the National Board of Medical Examiners. He served several years with the Kentucky State Board of Health as field director of county health work. During the first world war he served as a radio operator with the Royal Naval Volunteer Reserves.

Dr. Leonard A. Scheele, passed assistant surgeon, U. S. Public Health Service, has been assigned to the Washington staff of the medical division of the Office of Civilian Defense. Dr. Scheele graduated in medicine in 1933 at Wayne University College of Medicine, Detroit, and was commissioned to the Public Health Service following completion of his internship. After special training in clinical cancer work at Memorial Hospital for the Treatment of Cancer and Allied Diseases in New York he was assigned to the National Cancer Institute, Bethesda, Md., as consultant on cancer control.

Dr. Harold Marks, passed assistant surgeon (reserve), U. S. Public Health Service, joined the medical division of the Office of Civilian Defense recently. Dr. Marks graduated from the University of Illinois College of Medicine, Chicago, in 1936, interned at Sacred Heart Hospital, Spokane, Wash., and practiced in the state of Washington until 1940, when he entered the University of Chicago for a course in hospital administration. Before being assigned to the Office of Civilian Defense he was stationed at the National Institute of Health and was engaged in making medical surveys of medical care in defense communities.

Mr. Gerald E. Arnold, chief water purification engineer for the water department of San Francisco, has been appointed regional sanitary engineer for the ninth Civilian Defense region,

1. This is the rate of reimbursement established by the Federal Board of Hospitalization for federal beneficiaries in government hospitals and may be changed as conditions require.

which includes California, Idaho, Montana, Nevada, Oregon, Utah and Washington. Mr. Arnold was commissioned sanitary engineer (reserve) in the U. S. Public Health Service.

Mr. William H. Carey Jr. has been appointed regional sanitary engineer for the sixth and seventh Civilian Defense regions, plus Indiana and Kentucky, with headquarters in Chicago. Mr. Carey is a graduate of the University of Michigan College of Engineering and was formerly junior engineer with the Chicago Sanitary District and analyst and public health engineer with the U. S. Public Health Service and assistant engineer with the Michigan State Department of Health.

CARE OF BABIES DURING AIR RAIDS

Instructions as to the special care of babies in the event of an air raid, based in part on the experience of British cities, have been prepared by the American Committee on Maternal Welfare, 650 Rush Street, Chicago.

The committee is composed of the leading medical, public health, nursing and hospital organizations of the country. Aside from the immediate need of shelter from bomb explosions, the most important fact to keep in mind, the British have learned, is that the mother's mental attitude is baby's best guaranty against air raids. "However frightened you may feel," the committee quoted from instructions issued by the British National Baby Welfare Council, "keep outwardly calm, so that the child's confidence in your own protectiveness may not be shaken.

"Never speak of the raid in the child's hearing if you can avoid it. Mental impressions are formed much earlier than most people realize. Many of the problem cases among grown-ups of the present day owe their condition to their parents having talked continually in the presence of the children about past and future air raids, about their own terror, and the effect of this on the child."

When the raid signal sounds, the first move should be in the direction of the nearest shelter. If there is no shelter, take the baby to the safest room in the house or to a closet under the stairs or under a table or bed, so that he may be protected from flying debris, which presents the most frequent danger. Take with him garments enough to keep him warm according to the season, a basket or pillow on which he can lie, a first aid outfit in case of need; a toy to amuse him; his bottle of milk and bottle of water, together with extra diapers and related equipment. The baby's ears should be blocked with cotton to minimize the effects of concussion, leaving plenty outside so that it may be easily withdrawn afterward. If the raid should come while the baby is away from either house or shelter—for an airing in the park, for instance—find the nearest wall or ditch, however low, place the baby on the ground beside it, with pillows from the baby carriage or a heavy coat under and over him, and lie down beside him.

The problems of baby and mother in wartime and their safety will be discussed at the second annual Congress on Obstetrics and Gynecology, sponsored by the committee, in St. Louis, April 6 to 10.

THE COLLECTION OF MEDICAL MUSEUM MATERIAL

Col. J. E. Ash, M. C., U. S. Army, curator of the Army Medical Museum, Washington, D. C., states that the so-called museum and medical art activity of the army is being organized as a subdivision of the Museum Division of the Surgeon General's Office. The purpose is to obtain trained personnel, including clinical photographers and medical artists, who will serve with the expeditionary forces and in the larger army hospitals in order to collect pathologic material, pictorial records of diseases and injuries and their treatment, weapons, missiles and protective devices and arrange for their shipment to the Army Medical Museum. It is proposed also to collect similar material that might come to the attention of civilian pathologists and to add it to the collections of the armed forces. The civilian material in this category will include that arising from airplane crashes, civilian bombing, fires, specific epidemics, particularly the virus diseases, encephalitis, influenza, poliomyelitis and atypical pneumonia. All cases sent to the museum should be

accompanied by complete clinical data and necropsy protocols. Facilities are available, on request, to cover the shipment of this material and to process photographic material, including copying. Contributors would be credited in the museum files and would not lose control of their material. Colonel Ash welcomes suggestions that will aid in making this activity a success.

ARMY NEEDS TEN THOUSAND NURSES

The U. S. Army Nurse Corps has immediate need for three thousand qualified registered nurses, and for ten thousand in all before the end of 1942, to keep pace with the expanding army, the War Department announced on March 13. Applicants who can fulfil the Army Nurse Corps requirements will be appointed in the grade of Nurse, with the relative rank of Second Lieutenant. The pay is \$840 a year in addition to maintenance and uniform equipment. Appointments as nurse will be for the duration of the war. Promotions to higher grades are made in peace time only after three years of service, but this rule no longer applies. The appointment authority for the Army Nurse Corps is vested in the commanding generals of the various corps areas. However, applications for appointment may be made through any local office of the National Red Cross Nursing Service, which is acting as procurement agency for the corps. When the quota for any particular corps area may have been filled, applications will be referred to another corps area where a shortage exists.

An eligible applicant must be of good character, unmarried, a citizen of the United States, between 22 and 30 years of age, at least 5 feet tall and of standard weight for her age and height. She must be a graduate of an accredited high school giving a four year academic course and of a school of nursing of approved standards, and a registered nurse. Application papers must be accompanied by an unmounted autographed photograph of the applicant taken within the preceding two years, and a statement from the proper official of the high school from which she was graduated, giving the date of graduation and her numerical place in the class.

The physical fitness of an applicant is determined by an examination by a board of medical officers at the nearest army post.

ONE DAY "WAR SESSIONS"

The American College of Surgeons will hold one day "War Sessions" between April 1 and May 1 on problems of military service and civilian defense for medical and hospital personnel, as follows:

Date	Place	States	Headquarters
April 1	Portland, Me.	Maine, Vermont, New Hampshire	Eastland Hotel
April 3	Albany, N. Y.	New York	DeWitt Clinton Hotel
April 7	Denver	Colorado, Wyoming	Cosmopolitan Hotel
April 10	Salt Lake City	Utah, Idaho	Hotel Newhouse
April 13	Portland, Ore.	Oregon, Washington, Montana	Mulnomah Hotel
April 16	San Francisco	Northern California, Nevada	Fairmont Hotel
April 18	Los Angeles	Southern California	Biltmore Hotel
April 21	Phoenix, Ariz.	Arizona, New Mexico	Westward Ho Hotel
April 24	Dallas, Texas	Texas, Oklahoma	Baker Hotel
April 28	Madison, Wis.	Wisconsin	Lorraine Hotel
May 1	Minneapolis	Minnesota, South Dakota, North Dakota	Nicollet Hotel

During March similar meetings were held in Louisville, Ky.; Nashville, Tenn.; St. Louis; Chicago; Detroit; Columbus, Ohio; New Orleans; Atlanta, Ga.; Jacksonville, Fla.; Durham, N. C.; Baltimore; Harrisburg, Pa.; Newark, N. J., and New Haven, Conn.

The meetings open at 9 a. m. with panel discussions on treatment of war injuries for the medical profession and a forum on civilian defense as related to hospitals, led by a medical officer of the United States Office of Civilian Defense, for hospital personnel. A joint meeting also is held with medical officers of the Army, the Navy and the Office of Civilian Defense, as speakers. At the luncheon the Procurement and Assignment Service in relation to the medical profession and to hospitals is discussed by Major Sam F. Seeley, Executive Officer, a specially appointed delegate. In the afternoon panel discussions for the medical profession are held on treatment of wounds of soft parts and on fractures, and for hospital representatives on special problems incident to the war-as-affecting hospitals.

The success of the March meetings justified their extension to the remaining states, as shown by the April schedule. Hospital associations and state and county medical societies are cooperating with the American College of Surgeons in conducting the sessions.

THE WORK OF NURSES IN CIVILIAN DEFENSE

A nursing consultant is on duty as a member of the staff of the Medical Division of the Office of Civilian Defense in Washington, and the Subcommittee on Nursing of the Health and Medical Committee of the Office of Defense Health and Welfare Services also serves as the Nursing Advisory Committee of the OCD. To assist the regional offices of civilian defense, field nursing consultants of the U. S. Public Health Service, the U. S. Children's Bureau and the American Red Cross have been made available for consultation. One nurse representing the Red Cross and another representing one of the other two agencies have been assigned to each state. The most recent development in the nursing program is the establishment of state nursing councils, which are made up of representatives of nursing organizations, official agencies with nursing programs and the Red Cross. Nurses are required in the Emergency Medical Service now being developed by the medical division of the OCD for the care of casualties in hospitals and for service with emergency medical field units. Nurses will also be required for service in emergency base hospitals to be established in protected rural areas if needed for the reception of civilian casualties due to enemy action. Both the OCD and the Red Cross are urging promotion of the volunteer nurses' aide program to train assistants for nurses in casualty receiving hospitals and in field casualty services. Nurses are being urged by the medical division to arrange to teach home nursing courses, so that more women will be ready to care for sickness in their own homes during an emergency and relieve the hospitals of some of their load. Nurses are also asked to take Red Cross first aid courses so that they may be prepared to help in casualty services and also to qualify as instructors for first aid courses.

JAPANESE BURN YALE-IN-CHINA HOSPITAL

In a broadcast from Chungking, January 16, published in the February issue of *China at War*, the Voice of China observer spoke as follows concerning Japanese vandalism at the Yale-in-China Hospital after the Japanese began their retreat from Changsha: "The finest exposition of the Japanese 'new order' was provided by their wanton vandalism at the Yale-in-China Hospital. This magnificent two hundred bed establishment, situated outside of Changsha proper, was occupied by the Japanese between January 3 and 5. When the enemy occupied the hospital, the Chinese staff commanders held a conference to discuss whether or not to shell the building. They decided against it although it was an easy target for their heavy guns. Before they left, however, the Japanese set fire to the buildings, destroying about 80 per cent of them. Fortunately, owing to the foresight of the principal, Dr. Winston Pettus, and with the assistance of soldiers provided by the government, practically all equipment and the staff itself had been safely evacuated several days before the Japanese arrived."

DR. LANZA ON DUTY IN SURGEON GENERAL'S OFFICE

Dr. A. J. Lanza, member of the Council on Industrial Health of the American Medical Association, has been appointed lieutenant colonel in the medical corps of the army and assigned to the Division of Industrial Health in the Office of the Surgeon General, Washington, D. C. Lieutenant Colonel Lanza will be chief of the Occupational and Military Hygiene Subdivision, Preventive Medicine Division, which was formed on April 18, 1941 and which has the responsibility of initiating, coordinating and supervising all activities of the medical department in connection with the industrial hygiene program of the army. This subdivision has been engaged in making surveys of occupational hazards and diseases in army operative plants.

SOLDIERS IN COMBAT AREAS TO CARRY SULFANILAMIDE TABLETS

The War Department announced on March 5 that every American soldier who goes into a theater of operations will be equipped with twelve sulfanilamide tablets in a special spill proof metal box as a standard addition to the first aid equipment of all troops in combat areas. Medical officers attached to units are to instruct the soldier in the proper use of the tablets, and careful checks are to be made periodically to see that each soldier carries the tablets. Experience in this war already has demonstrated the efficacy of the drug under war conditions, the War Department says. The small special container for the tablets can be operated with one hand by sliding the top of the box back, thus releasing a single tablet. Directions for use are printed on the back of the box.

MEDICAL LICENSURE IN RELATION TO THE ACCELERATED MEDICAL COURSE

The Federation of State Medical Boards of the United States has mailed to all state boards of licensure and registration, the District of Columbia, Alaska and Puerto Rico, and to the deans of medical schools, a statutory description of medical schools from which present graduates are eligible for licensure; also a resolution adopted by the federation endorsing the proposed accelerated course of medical education as a war emergency measure and pointing out that it is not expected to extend beyond the present period of the war. The proposal to accelerate the training of medical students so they will be able to graduate after three calendar years of instruction will raise questions concerning medical licensure. The memorandum states that in the following nine states and the territory of Puerto Rico there are statutory provisions that will have to be modified, probably by legislative amendment, before licenses can be granted to persons who have graduated after three calendar years of instruction: Georgia, Illinois, Kansas, Maryland, Michigan, Nebraska, New Jersey, South Carolina and Virginia.

In the following sixteen states and the District of Columbia, statutory provisions obtain that will necessitate rather liberal construction, either by special state board action or by state's attorney general's opinion, to permit the granting of licenses: California, Connecticut, District of Columbia, Indiana, Kentucky, Massachusetts, Minnesota, Mississippi, Missouri, Montana, North Carolina, North Dakota, Oregon, Pennsylvania, Tennessee, Texas and Utah.

In the following eleven states the statutory provisions seem broad enough to permit the granting of licenses to such graduates if the examining boards or other state approving agencies will recognize a medical school that graduates students after the abbreviated course of study: Alabama, Delaware, Florida, Iowa, Louisiana, Maine, New Hampshire, New York, Ohio, South Dakota and Wyoming. In these states, if standards have been set up by examining boards or other approving state agencies by rule or regulation, and if existing standards preclude the licensure of graduates after abbreviated courses, the rules or regulations must be amended to permit such licensure.

In the following five states and the territory of Alaska, graduates after abbreviated courses may obtain licensure if the school of graduation is approved by the Association of American Medical Colleges: Alaska, Arizona, New Mexico, Nevada, Oklahoma and Washington.

In the following seven states licensure may be obtained if the school of graduation is approved by the Council on Medical Education and Hospitals of the American Medical Association: Arkansas, Colorado, Idaho, Rhode Island, Vermont, West Virginia and Wisconsin.

In the material sent out by the Federation of State Medical Boards of the United States, as indicated, there are in addition to the foregoing information expressions of opinion from various state licensing boards and some attorney generals of states with regard to the question of licensure in relation to the accelerated medical course as it pertains to the individual states and territories.

MEDICAL SUPPLIES FOR RUSSIA

Edward C. Carter, president of Russian War Relief, Inc., announced on March 4 that one of the largest shipments of medical supplies and foods contributed by American citizens had been made to Russia. The shipment included fifteen thousand surgical needles, an x-ray machine, thirty cases of assorted pharmaceuticals, including gauze and adhesive plaster, 5 tons of acetophenetidin, 10 tons of saccharin, thirty-seven thousand and two hundred cans of condensed milk and two million American cigarettes, each package bearing a label in Russian expressing admiration for the fight the Russian people are making. The shipment was assembled and dispatched by Russian War Relief, Inc., 535 Fifth Avenue, New York.

TRAINING MEDICAL OFFICERS

A class was graduated from a special course in the Medical Field Service School, Carlisle Barracks, Pa., February 20. A second special officers' course of four weeks' duration will be given at the Field Service School beginning March 13. The commandant of the Field Service School, Brig. Gen. Addison D. Davis, M. C., U. S. Army, awarded diplomas to the following graduates:

MEDICAL CORPS

Major Clifford A. Best, Manning, Iowa.
1st Lieut. Marion G. Brown, Detroit.
Major John B. Chester, Nashville, Tenn.
Capt. Clarence E. Dungan, Almond, N. Y.
Capt. Arlo K. Cox, Watonga, Okla.
Capt. James K. Goldstene, Chicago.
1st Lieut. Ernst A. Griep, Quincy, Ill.
Major William A. Hadly, Pittsburgh.
Capt. William H. Houston, Palo Alto, Calif.
Capt. Paul D. Keller, Minkereek, Idaho.
Capt. Raymond A. Lawn, Minneapolis.
Capt. William C. Lindstrom, Oklahoma City.
Capt. John G. McKeon, Albany, N. Y.
1st Lieut. Edward G. McNamara, Chicago.
Major Walter C. Mohr, Chicago.
Capt. Michael R. Murphy, Cadillac, Mich.
Capt. Isaiah R. Salladay, Pierre, S. D.
Capt. George I. Sneiderman, Hartford, Conn.
1st Lieut. Sherburne M. Stanley, Asheville, N. C.
1st Lieut. Gustaf Sweet, Providence, R. I.
Major William E. Williams, Austin, Texas.
1st Lieut. Edwin C. Yeary, Elmore City, Okla.

MEDICAL ADMINISTRATIVE CORPS

2d Lieut. John O. Andrews, Ottawa, Ill.
Capt. David M. Goldberg, Peabody, Mass.

TEXTBOOK ON WAR GASES

"Protection Against Gas," a textbook on war gases to be used for instruction of public employees and volunteers enrolled in the various groups of the United States Citizens' Defense Corps, has been issued by the U. S. Office of Civilian Defense. The book was prepared by the War Department under the direction of the Chief of Chemical Warfare Service, U. S. Army, with suggestions of the National Technological Civil Protection Committee, a special advisory committee of engineers. The section on "First Aid Treatment of Gas Casualties" was prepared with the assistance of the Medical Division of the Office of Civilian Defense. The seventy-five page manual contains descriptions of the principal gases, their effects and the first aid measures to be used in the care of persons who have been subjected to gas attack. Methods of individual protection, which include the use of masks and wearing of protective clothing, and methods of collective protection such as use of gas proof shelters and methods of decontamination, are described. There is a chapter on protection of animals, especially horses and homing pigeons.

MINNESOTA HOSPITAL UNIT ON ACTIVE DUTY

The University of Minnesota Medical School, Minneapolis, at the invitation of the Surgeon General of the Army, has provided the staff for the Twenty-Sixth U. S. General Hospital unit, which was recently called to active duty and stationed in the South for a period of training. During World War No. 1 the University of Minnesota Medical School, in cooperation with the Mayo Clinic, provided a staff for Base Hospital No. 20, which served at Allerey, France.

ILLINOIS PLASMA PROCURING PROGRAM

The Illinois Department of Public Health, at the request of Governor Green, is formulating plans for collecting, processing and distributing throughout the state blood plasma to be used in possible civilian disasters without infringing on territory already given over to American Red Cross projects for collecting blood for the armed forces. The department expects to call for volunteer donors for civilian defense and to process the blood in a laboratory approved by the National Institute of Health. The Illinois plan, which has been approved by the Office of Civilian Defense in Washington, will obviate the need for independent local plasma programs in the down state area and will avoid the danger attendant on having local plasma supplies processed in unapproved laboratories. The Illinois Department of Public Health encourages local communities which have the facilities to do so to examine, type and register volunteer blood donors who could be called on for person to person transfusions in case of need. This type of transfusion, the state health department says, could be used for later treatments after the emergency administration of plasma.

COLUMBIA UNIVERSITY HOSPITAL UNIT ORDERED TO ACTIVE SERVICE

The Second U. S. Army General Hospital Unit, consisting of fifty-five members of the staffs of the College of Physicians and Surgeons, the School of Dental and Oral Surgery and the Columbia-Presbyterian Medical Centers, have been called to active duty. The chief of the surgical service is Dr. W. Barclay Parsons, associate professor of clinical surgery, and the chief of the medical service is Dr. Yale Kneeland Jr., assistant professor of medicine, both of whom are lieutenant colonels. Other members of the faculty have been granted leaves of absence to enter active service with the Medical Corps of the Army and Navy.

WOMEN AVAILABLE FOR WAR INDUSTRIES

A report just issued by the United States Department of Labor states that nearly six million women can be recruited for work in war industries during 1942. One third will be drawn from the sixteen million five hundred thousand women now in the 18 to 44 age group who also do their own housework without drawing into the labor market mothers from families with children under 10. The Labor Bureau recommends that women be taken into factories from converted or curtailed consumer goods industries before those with children under 10 are drawn into factory work. It is pointed out that five hundred thousand women were already in the total war labor force in January and that this total is expected to increase by anywhere from five million to fifteen million by 1943.

DR. BAYNE-JONES ON DUTY IN SURGEON GENERAL'S OFFICE

According to the *Army and Navy Journal*, Lieut. Col. Stanhope Bayne-Jones, medical reserve corps, U. S. Army, has reported for duty in the Office of the Surgeon General, Washington, D. C., and assigned as chief of the subdivision of epidemiology. Colonel Bayne-Jones, who in civil life is professor of bacteriology at Yale University, New Haven, Conn., entered the reserve corps in 1915 and served throughout the first world war.

STOVES AND MEDICAL SUPPLIES FOR RUSSIA

In a shipment of relief supplies from an Atlantic port by Russian War Relief, Inc., there were thousands of field type kerosene stoves which had been urgently requested by the Russian authorities for use in hospital tents and refuge colonies, in addition to 12,000 ounces of quinine hydrochloride, 10,000 ounces of quinine sulfate and other medical supplies. This is the sixth shipment of supplies to Russia by Russian War Relief, Inc., 535 Fifth Avenue, New York.

ORGANIZATION SECTION

OFFICIAL NOTES

THE ATLANTIC CITY SESSION

The Annual Golf Tournament

The American Medical Golfing Association will hold its twenty-eighth annual tournament at Seaview Country Club, Atlantic City, on Monday, June 8.

FORTY TROPHIES AND PRIZES

Thirty-six holes of golf will be played in competition for the forty trophies and prizes in the eight events. Trophies will be awarded for the Association Championship, thirty-six holes gross, the Will Walter Trophy; the Association Handicap Championship, thirty-six holes net, the Detroit Trophy; Championship Flight, First Gross, thirty-six holes, the St. Louis Trophy; Championship Flight, First Net, thirty-six holes, the President's Trophy; Eighteen Hole Championship, the Golden State Trophy; Eighteen Hole Handicap Championship, the Ben Thomas Trophy and the Atlantic City Trophy; Maturity Event, limited to Fellows over 60 years of age, the Minneapolis Trophy; and the Oldguard Championship, limited to competition of past presidents, the Wendell Phillips Trophy. Thirty other prizes will be awarded for the various flights.

ATLANTIC CITY GOLF COMMITTEE

The Atlantic City Golf Committee is under the chairmanship of Dr. Walt P. Conaway, 1723 Pacific Avenue, Atlantic City, who managed the 1925 tournament at Seaview, the 1935 com-

petition at Northfield Club and the 1937 tournament at Seaview. Assisting Dr. Conaway on the Atlantic City committee are Drs. John Pennington and Karl M. Scott.

TWO EIGHTEEN HOLE COURSES

The 1942 tournament of the American Medical Golfing Association will be played over the two eighteen hole championship courses of the Seaview Country Club at Absecon, N. J. Following the tournament the Annual Golfers' Banquet will be held at the spacious clubhouse beginning at 7 p. m., after which the prizes will be distributed. The officers of the American Medical Golfing Association anticipate that medical golfers from all parts of the United States will play thirty-six holes of golf at Seaview on June 8.

APPLICATION FOR MEMBERSHIP

All male Fellows of the American Medical Association are eligible and cordially invited to become members of the American Medical Golfing Association. Write Executive Secretary Bill Burns, 2020 Olds Tower, Lansing, Mich., for an application blank. Participants in the American Medical Golfing Association tournament are required to present their home club handicap, signed by the club secretary, at the first tee on the day of play. No handicap over thirty is allowed. Only Active Fellows of the American Medical Golfing Association may compete for prizes. No trophy is awarded a Fellow who is absent from the annual dinner.

MEDICAL LEGISLATION

MEDICAL BILLS IN CONGRESS

Change in Status.—H. R. 6730 has been reported to the House, without amendment, proposing to regulate the mail order business in dentures.

Bills Introduced.—S. 2270, introduced by Senator Green, and H. R. 6701, introduced by Representative Forand, both of Rhode Island, propose to amend the Social Security Act so as to provide federal grants to states for war displacement assistance, for special wartime assistance and for other general public assistance. The purpose of the bills is to provide security (1) for workers unemployed because of priorities and the conversion of industries to war production, (2) for persons in need because of other wartime conditions and (3) for other persons in need. S. 2320, introduced by Senator Downey, California, provides that all persons engaged in civilian defense duty under the laws of the United States or of any state, or political subdivision thereof, who sustain disease or injury while in the lawful performance of such duty shall be paid by the United States monthly compensation for such disease or injury. S. 2335, introduced by Senator Stewart, Tennessee, proposes a federal appropriation in such amount as may be necessary to enable each state to furnish financial assistance to needy individuals who are permanently and totally disabled. S. 2371, introduced by Senator Tunnell, Delaware, proposes to regulate the mail order business in dentures. This bill is similar to H. R. 6730, which has already been reported to the House, as already indicated. H. R. 6710, introduced by Representative Martin J. Kennedy, New York, proposes to amend the Soldiers' and Sailors' Relief Act of 1940 so as to waive the collection of any income tax in the event that the taxpayer dies while in military service. H. R. 6744, introduced by Representative Collins, Mississippi, proposes to extend the benefits of the Social Security Act now applicable to the blind to persons permanently crippled to a degree which renders them unable to engage in a gainful occupation.

STATE MEDICAL LEGISLATION

Kentucky

Bill Introduced.—H. 335, to amend the premarital physical examination law, proposes to authorize the required examination to be made by physicians of an army medical department or by physicians in an adjoining state, if the adjoining state also requires a premarital examination for the presence of syphilis.

Bill Enacted.—H. 315 exempts from the operation of the uniform narcotic act the "administering, dispensing or selling at retail of any medicinal preparation that contains in 1 fluidounce or, if a solid or semisolid preparation, in 1 avoirdupois ounce, not more than 1 grain of codeine or any of its salts." The former law also exempted from the operation of the act the prescribing, administering, dispensing or selling at retail of any medicinal preparation that contains in 1 fluidounce, or, if a solid or semisolid preparation, in 1 avoirdupois ounce, not more than 2 grains of opium, not more than $\frac{1}{4}$ grain of morphine or any of its salts, not more than 1 grain of codeine or any of its salts, not more than $\frac{1}{8}$ grain of heroin or any of its salts, and not more than one of any of said drugs.

Michigan

Bills Enacted.—H. 15-XX authorizes the state commissioner of health to manufacture or purchase antitoxin, sulfonamides, biologic products, silver nitrate ampules, arsphenamines and heavy metals and to furnish them to health officers and health boards, county hospitals and municipal hospitals of the state for use in the control of communicable diseases. H. 16-XX requires physicians to report all cases of venereal diseases coming under their professional observation. The state health commissioner is authorized to make rules and regulations for the care, treatment, hospitalization and isolation of persons afflicted with venereal diseases, but such persons shall have the right to select the physician or mode of treatment of his choice.

Mississippi

Bills Introduced.—H. 738, to amend the law relating to the sale of eyeglasses, proposes to make it an unlawful act for any physician or surgeon to advertise in any manner, either directly or indirectly, any fraudulent, false or misleading statement as to the skill or method of practice of himself or of any other physician or surgeon, or to advertise in any manner that will tend to deceive, mislead or defraud the public. H. 135, to regulate and define the practice of cosmetic therapy and to provide for the administration of said act, proposes to authorize the creation of a board of cosmetic therapy to examine and license persons desiring to practice that art. Cosmetic therapy or beauty culture as defined by this act would include, among other things, the following: "and/or with hands or mechanical or electrical apparatus or appliances, . . . massaging, cleansing, stimulating, manipulating, exercising, beautifying, or similar work, on the scalp, face, neck, arms, but, or any part of the body, . . ." H. 766 proposes to provide for the commitment, custody, maintenance and discharge of insane persons and proposes that persons may be adjudged insane on a certificate of lunacy made by two qualified examiners, who should be physicians.

Bill Enacted.—S. 152, to amend the pharmacy act, provides that persons formerly licensed as an assistant pharmacist who had been engaged in practice as an assistant pharmacist for a period of five years shall be licensed to practice pharmacy on passing the required examination and furnishing satisfactory evidence of education and other qualifications. The act further provides that this special provision allowing the granting of a full license to assistant pharmacists shall be in force only during the national emergency proclaimed by the President of the United States and for six months thereafter.

New Jersey

Bills Introduced.—A. 170 proposes the creation of a state eugenic commission and the appointment of a state eugenist and declares it to be the policy of the legislature to ameliorate the living conditions of afflicted individuals and to promote the social welfare by the sexual sterilization, either voluntary or compulsory, of persons suffering from mental deficiency, familial mental disease, familial epilepsy, familial blindness, familial deaf-mutism, familial gross deformity and familial neurological disease. Mental deficiency is defined by the act as "an irremediable arrest of brain development producing such lack of intelligence as results in social incompetence." A. 171 proposes that any inmate of an institution within the jurisdiction or control of the department of institutions and agencies who shall be so afflicted as to come within the provisions of any law of the state requiring voluntary or compulsory sterilization shall not be permitted to leave such institution until he shall have been subjected to such sterilization treatment as the law shall require.

New York

Bills Introduced.—S. 1210 and A. 1403, to amend the education law, propose to change the filing fees for professional licenses in New York City from \$1 to \$2 to make it accord with fees imposed for other services. A. 1267, previously reported, has been amended by the assembly so that its terms should apply to "any public hospital in the state" rather than "to any hospital of the state" as provided in the original bill. A. 1434, to amend the education law, proposes the creation of a state board of chiropractic examiners to examine and license applicants desiring to practice chiropractic in the state. The practice of chiropractic is defined as the science of locating and the removing of nerve interference in the human body, according to chiropractic principles, where such interference is indicated or misalignment or subluxations of the vertebral column appear. It excludes operative surgery, the reduction of fractures, the prescription or use of drugs or medicine, and the practice of obstetrics.

Bill Enacted.—S. 100, to amend the public health law, provides for the furnishing of hospital or institutional care under the surveillance of the local health officer at the expense of the state to individuals declared by the state commissioner of health to be carriers of typhoid fever bacilli.

Pennsylvania

Bill Introduced.—S. 41, to amend the unemployment compensation act, proposes among other things to exempt from the operation of the act services performed by a student nurse in the employ of a hospital or a nurses' training school by an individual who is enrolled and is regularly attending classes in a nurses' training school chartered or approved pursuant to the laws of this commonwealth and services performed by an intern in the employ of a hospital by an individual who has completed a four years course in a medical school chartered or approved pursuant to the laws of this commonwealth.

Rhode Island

Bills Introduced.—H. 819, to amend the factory law, proposes to require all companies operating any mechanical establishment where machinery is used for manufacturing to maintain fully equipped at all times a modern medical or surgical chest which shall contain plasters, bandages, absorbent cotton, gauze, antiseptics, ointments, medicine, equipment, first aid instruments and appliances necessary to render adequate first aid treatment to persons injured or taken ill on the premises. The bill further proposes that any firm or corporation employing 100 persons or more shall set aside a special accident room under the supervision of a registered nurse who has taken special courses in first aid treatment from some recognized educational institution or hospital or the American Red Cross that shall meet with the approval of the director of health.

Virginia

Bills Introduced.—S. 268, to amend the narcotic drug act, proposes to exempt from the application of the act the administering, dispensing or selling at retail of any medicinal preparation that contains in 1 fluidounce, or, if a solid or semisolid preparation, in 1 avoirdupois ounce, not more than 1 grain of codeine or of any of its salts. The present law also exempts from the application of the act certain preparations containing opium, morphine and heroin as well as codeine.

Bills Passed.—The following bills have passed the Senate: S. 189, to amend the medical practice act, proposes to authorize the state board of medical examiners to admit to examination all applicants who have completed in not less than thirty-two months the four courses of at least eight months each required by the present law. Under the present law such four courses must have been given in four different calendar years. S. 219, to amend the law relating to the sale of certain hypnotic drugs, proposes that the term "dangerous drug" shall include, in addition to those covered by the present law, the following: "Sulfanilamide (para-amino-benzene-sulfonamide), Sulfathiazole, Sulfapyridine, Sulfadiazine, Sulfaguanidine and any Sulfanilamide derivatives by whatsoever trade name or designation; or any related compound, preparation, mixture or salt thereof; or any salt or derivative thereof; or any preparation or mixture containing any of them." These drugs may be sold only on a physicians' prescription, which may not be refilled except in the case of persons suffering from chronic afflictions or diseases. The following bill has passed the house: H. 421, to amend the alcoholic beverage control act, proposes that alcoholic beverages may be sold only in drug stores, only for medicinal purposes and only on a physician's written prescription.

Bills Enacted.—S. 110 increases the per diem fee to be received by members of the board of medical examiners except the secretary from \$8 to \$10 and increases the maximum salary which the secretary may be allowed from \$1,000 to \$1,500. S. 113 provides that no person shall sell any patent, proprietary or domestic medicines, salve, liniment or compounds of a like kind, or any spices, or extracts, toilet articles or other articles of like kind without a license. Exempted from the operation of this act are licensed merchants but not licensed physicians. S. 120 provides that no institution of learning in the state of Virginia shall confer any college degree, whether academic, professional or honorary, unless and until such institution has been approved for such purpose by the state board of education. This act does not apply, however, to an institution of higher learning accredited by the state board of education for granting of college degrees or specifically authorized by an act of the general assembly.

Medical News

(PHYSICIANS WILL CONFER A FAVOR BY SENDING FOR THIS DEPARTMENT ITEM OF NEWS OF MORE OR LESS GENERAL INTEREST, SUCH AS RELATE TO SOCIETY ACTIVITIES, NEW HOSPITALS, EDUCATION AND PUBLIC HEALTH.)

ADDITIONAL MEDICAL, COLLEGE NEWS AND ARTICLES APPEAR IN THE STUDENT SECTION, PAGE 1017

CALIFORNIA

Dr. Brunn Honored.—Pupils and friends of Dr. Harold Brunn, clinical professor of surgery, University of California Medical School, San Francisco, have collaborated in a book entitled *Medico-Surgical Tributes to Harold Brunn*, which has just been published. The foreword is written by Robert Gordon Sproul, president of the University of California, and the preface, by Dr. Langley Porter, dean emeritus of the medical school. Dr. Brunn graduated at the University of Pennsylvania School of Medicine, Philadelphia, in 1895. He has been associated with California since 1898.

The Lane Lectures.—The Stanford University School of Medicine, San Francisco, announces the sixtieth course of popular medical lectures to be given at Lane Hall by the following San Francisco physicians:

Dr. John R. Upton, *The Blood Bank Its Purpose and Uses in War*, June, April 3

Dr. Anthony John J. Rourke, *Medical Aspects of Civilian Defense*, April 17

Dr. Henry W. Newman, *Alcohol in Relation to Driving Hazards*, May 1

Dr. Charles W. Barnett, *Control of Venereal Disease Under War Conditions*, May 15

All are of San Francisco

Examination for Consulting Psychiatrist.—The California State Personnel Board announces that an examination will be held to fill a position as consultant psychiatrist in the state department of social welfare. Applications must be filed by March 31. Candidates who are successful in the examination must secure a license to practice medicine in California before they can be considered eligible for appointment. They must also have five years' experience in psychiatric therapy, two years of which must have been full time in a child guidance clinic or in some other form of preventive mental hygiene with children in an agency regularly employing full time services of a psychologist and psychiatric social worker. Headquarters will be in Sacramento, but considerable traveling throughout the state is required. The entrance salary will be \$400 a month. Communications should be sent to the state personnel board at Sacramento

CONNECTICUT

School Health Education Conference.—"How the Schools May be Melt to Service in the Present Defense Emergency" will be the theme of a statewide school health education conference in West Hartford, March 24, under the auspices of the state department of health, state department of education and the Connecticut Tuberculosis Association. Section meetings on physical fitness, nutrition and health policies and practices will open the conference. Two general sessions will follow. The speakers will include Neils P. Neilson, A.M., Washington, D. C.; Drs. Creighton Barker, New Haven; Harry E. Kleinschmidt, New York; Charles C. Wilson, New York; Ita V. Hiscock, C.P.H., New Haven, and Mrs. Chase Going Woodhouse, Hartford, secretary of state.

DISTRICT OF COLUMBIA

Interprofessional Society Organized.—The Medical Society of the District of Columbia recently sponsored the organization of the Interprofessional Conference to discuss mutual problems of the pharmaceutical, dental and nursing professions; hospital representatives also are included. Dr. Robert Lomax Wells was elected chairman of the conference and Mr. Theodore Wiprud, secretary of the medical society, secretary. Each professional group alternately acts as host at meetings.

The Food Front.—A series of lectures on the Food Front opened, March 11, in the U. S. Department of Agriculture Auditorium, Washington, to continue through April 15. Paul V. McNutt, administrator, Federal Security Agency, and director of the Office of Defense Health and Welfare Services, and Craig McGeachy, public relations officer, British embassy,

gave the first two lectures, on "The National Nutrition Program" and "What the War Has Taught Us About Food" respectively. On March 18 Dr. Thomas Parran, surgeon general, U. S. Public Health Service, spoke on "Nutrition and Public Health" and Paul Cornell, consultant, Nutrition Division, Office of Defense Health and Welfare Service, "Factors Affecting Public Acceptance of the Nutrition Program." The rest of the series follows:

Hazel K. Stiebeling, Ph.D., senior food economist, Bureau of Home Economics, Department of Agriculture, How Well Fed Is the American Family? March 25.

Dr. Martha M. Eliot, associate chief, Children's Bureau, Department of Labor, Nutrition and the Child, March 25.

Father L. Bitchelder, Ph.D., chief, Foods and Nutrition Division, Bureau of Home Economics, Department of Agriculture, Conserving the Foods We Produce, April 1.

Eugene C. Auchter, Ph.D., Agricultural Research Administration, Department of Agriculture, Interrelationship of Soil, Plant and Human Nutrition, April 1.

Claude R. Wickard, Secretary of Agriculture, Food Production Goals, April 8.

R. B. Brand, head, British Food Mission in North America, The British Food Supply, April 15.

Dr. Frank G. Boudreau, New York, chairman, Food and Nutrition Board, National Research Council, Present and Future Food Supply and Some International Implications, April 15.

ILLINOIS

Annual Lecture of Springfield Club.—Dr. Perrin H. Long, Baltimore, delivered the tenth annual lecture of the Springfield Medical Club in Springfield, March 18, on "The Latest Aspects of Sulfonamide Therapy."

District Meeting.—The spring meeting of the Iowa and Central District Medical Association will be held at the Fort Armstrong Hotel in Rock Island, March 26. Dr. Robert Lee Sanders, associate professor of surgery, University of Tennessee College of Medicine, Memphis, as guest speaker will discuss "Surgical Lesions of the Colon." Dr. Florian E. Schmidt, Chicago, of the Lederle Laboratories, will show a motion picture in color with sound on "All Sulfonamide Therapy."

Chicago

Course in Neuromuscular Anomalies of the Eyes.—The eighth semiannual postgraduate course in muscles of the eyes will be given at the Children's Memorial Hospital, May 3-8. The lectures will be given by Dr. George P. Guibor. The courses will include lectures and clinical demonstrations of muscle defects of the eyes. Inquiries regarding the course may be addressed to the hospital, 707 Fullerton Avenue.

Society News.—At a meeting of the Chicago Gynecological Society, February 21, Dr. George F. Pendleton, Kansas City, Mo., spoke on "Maternal Health in Kansas City"; Dr. James F. Nolan, St. Louis, and Dr. Axel N. Arneson, St. Louis, "The Use of Radium in the Treatment of Corpus Cancer."—The Chicago Urological Society was addressed, February 26, by Dr. Walter G. Sexton, Marshfield, Wis., on "Cortical Hypernephroma"; Dr. Leslie L. Vesceen, lieutenant commander, U. S. Navy, "Urological Routine in the Navy"; Drs. Harry C. Rolnick and Israel Davidsohn, "Involvement of the Kidney in Periarthritis Nodosa," and Dr. Russell D. Herrold, "Failures and Problems of Chemotherapy in Urology."

IOWA

Regional Meeting on Physical Therapy.—The spring session of the Midwestern Section of the American Congress of Physical Therapy will be held at the University Hospitals, Iowa City, April 6. The following program will be presented:

Dr. Stuart C. Cullen, Iowa City, The Rationale of Oxygen Therapy During Hyperpyrexia.

Dr. Max K. Newman, Detroit, Hypothermic Anesthesia in Extremity Surgery.

Adelaide P. Barer, Ph.D., Iowa City, The Effect of Ultraviolet Irradiation on Hemoglobin Formation.

Dr. John S. Coulter, Chicago, Physical Therapy in Fractures.

Dr. Arthur Stendler, Iowa City, The Treatment of Acute and Subacute Polyomyelitis.

Dr. Frank H. Krusen, Rochester, Minn., The Relation of Physical Therapy in War.

State Medical Meeting.—The ninety-first annual session of the Iowa State Medical Society will be held at the Hotel Fort Des Moines, April 15-17, under the presidency of Dr. Earl B. Bush, Ames. The guest speakers will include:

Dr. John A. Toomey, Cleveland, Differential Diagnosis of Meningeal Irritations.

Dr. James T. Priestley, Rochester, Minn., Carcinoma of the Stomach.

Dr. Sumner L. S. Koch, Chicago, Treatment of Raw Surfaces Resulting from Burns and Injuries.

Dr. John L. McKelvey, Chicago, Section.

Dr. French K. Hansel, Chicago, if Treating Strabismus.

Dr. Oscar B. Nugent, C. of Gallstone Disease.

Dr. Reginald Fitz, Boston, Fractures Around the Knee Joint.

Dr. William R. Cubbins, Chicago, Fractures Around the Knee Joint.

There will be general sessions, sectional meetings and clinics, with Iowa physicians participating. One general session will be devoted to a symposium on injuries, to be followed by an address on the "Procurement and Assignment of Physicians" by Major Sam F. Sceley, M.D., Washington, D. C. The Iowa Orthopedic Club, the Iowa State Pediatric Society, the State Society of Iowa Medical Women and the American Medical Women's Association, branch 19, are among the groups that are also planning meetings at this time. The woman's auxiliary to the state medical society will hold its thirteenth annual meeting at the Hotel Kirkwood, April 15-16.

MICHIGAN

Increase in Biologic Products.—The state health department has announced that a 10 per cent increase in the distribution of biologic products was noted in 1941 as compared with 1940. These included vaccines against smallpox, diphtheria and whooping cough, antitoxins and serums, all produced in the state department laboratories at Lansing. The department reported that vaccines, serums and other biologic products distributed free to physicians in 1941 reached an all time high of 2,499,618 doses.

Changes in Health Personnel.—Dr. Henry G. Steinmetz, Flint, health commissioner of Genesee County, has been appointed assistant director to the bureau of venereal diseases in the state department of health. Dr. Lars W. Switzer, Cassopolis, health officer of Cass County, will serve as health officer until the return of Dr. Leslie V. Burkett, Flint, in June. Dr. George F. Moench has been appointed director of the Calhoun County Health Department, Marshall, succeeding Dr. Hugh B. Robins, who is on leave doing graduate work at the University of Michigan School of Hygiene and Public Health. Dr. Moench was formerly director of the Delaware County Health Department, Delaware, Ohio.

NEBRASKA

Contest on Biography of Pioneer Physician.—The Native Sons and Daughters of Nebraska is sponsoring a contest on the biography of a pioneer Nebraska physician. According to the rules of the contest a pioneer is "any one engaged in the practice of medicine within the present boundaries of the state prior to 1890, or within the first twenty years of a community's life." The essay must not be longer than four thousand words. Any Nebraska resident is eligible. The time limit is June 30.

NEW JERSEY

Forty-Three Years as Health Officer.—Dr. Alton S. Fell, health officer of Trenton for forty-three years, retired on March 1. Dr. Fell graduated at Hahnemann Medical College and Hospital of Philadelphia in 1894.

Society News.—Dr. Oswald S. Lowsley, New York, discussed "Recent Advances in Modern Urology" before the Essex County Medical Society, March 12. The Gloucester County Medical Society was addressed, February 19, by Dr. Joseph C. Yaskin, Philadelphia, on "The Neuroses from the Standpoint of the General Practitioner." The Camden County Medical Society meeting, February 3, was addressed by Dr. Jonathan E. Rhoads, Philadelphia, on "Newer Concepts of Liver Disease." Dr. John Scudder, New York, addressed the Morris County Medical Society, February 19, Greystone Park, on "The Modern Treatment of Shock."

NEW YORK

Bacteriologist Granted Leave for Latin American Survey.—Robert S. Breed, Ph.D., chief in research bacteriology, New York State Agricultural Experiment Station at Geneva since 1913, has been granted a leave of absence to conduct a survey of dairy research and education in South America for the Inter-American Committee for the Dairy Industry, according to *Science*. Dr. Breed received his doctor of philosophy degree at Harvard University in 1902. He served as vice president of the World Dairy Congress at Washington-Syracuse, 1923, and London, 1928. He was chairman of the laboratory section of the American Public Health Association in 1934.

Youth Educational Program.—The Health Division of the National Youth Administration and the state department of health have arranged a program of health education in fifteen NYA resident centers and thirty-five nonresident workshops throughout the state, supplementing the regular health program of the administration. The primary object of the program is to make a physical study and appraisal of each youth through a competent over-all medical examination and, with the cooperation of the health agencies and through coun-

seling with youths, to effect correction of physical defects and rehabilitation of those requiring special medical services. Competent speakers and supplementary educational material will be available. In the educational project emphasis will be placed on information regarding tuberculosis, venereal disease, accidents and nutrition.

New York City

Alumni Meeting.—The Cornell University Medical College Alumni Association will hold its annual meeting at the college, April 16, when a scientific program will be presented. A banquet will be held in the evening at the Waldorf-Astoria.

The Miller Memorial Lecture.—Dr. Eliot Round Clark, professor of anatomy, University of Pennsylvania School of Medicine, Philadelphia, delivered the sixth Adam M. Miller Memorial Lecture at the Long Island College of Medicine, January 16. His subject was "The Behavior of Cells and Tissues in the Living Mammal as Observed Through the Microscope."

Clinical Session on Pulmonary Diseases.—Dr. Lloyd F. Craver of the Memorial Hospital for the Treatment of Cancer and Allied Diseases conducted a symposium on "Pulmonary Tumors in Persons Under Thirty Years of Age" at the twenty-ninth clinical session on chronic pulmonary diseases, February 11. Preceding the meeting there was a presentation and discussion of x-ray films.

Courses in Gastroenterology and Cardiovascular Diseases.—Two full time courses of four weeks each in gastroenterology and cardiovascular diseases will be held at Mount Sinai Hospital, April 6-May 2, in cooperation with Columbia University. Additional information may be obtained from Edith Levy, secretary for medical instruction, Mount Sinai Hospital, Fifth Avenue and One Hundredth Street.

Program on Sulfonamides.—The New York Branch of the American Pharmaceutical Association held a special meeting, February 9, at the Columbia College of Pharmacy, to discuss "The Sulfonamides." The speakers included Curt P. Wimmer, Ph.M., on "The Pharmacology of the Sulfonamides"; Dr. Salo N. Weber, "Sulfonamides in the Treatment of Pneumonia"; Dr. Adolph Jacoby, "Sulfonamides in the Treatment of Gonorrhea and the Venereal Diseases," and Dr. Maurice J. Costello, "Sulfonamides in Treatment of Disease of the Skin."

Friday Afternoon Lectures.—The Medical Society of the County of Kings, Brooklyn, opened a series of Friday afternoon lectures and Monday panel discussions with a talk by Dr. Gregory L. Robillard, March 6, on "Tumors of the Breast." The entire program of lectures is as follows:

- Dr. Albert F. R. Andresen, Diarrheas in Adults, March 13.
- Dr. Meyer A. Rabinowitz, Thrombosis-Embolism and Thrombophlebitis, March 20.
- Dr. Louis Chargin, New York, Massive Dose of Arsenotherapy for Syphilis, March 27.
- Dr. Eugene R. Marzullo, Transfusions, April 10.
- Dr. Wheelan D. Sutliff, New York, Sulfonamide Therapy, April 17.
- Dr. Thurman B. Givan, Diarrheas in Infancy and Childhood, April 24.

On the Monday following the lecture a panel discussion was held on the subject.

PENNSYLVANIA

Society News.—The Pennsylvania Psychiatric Society held its third midyear meeting at the Harrisburger Hotel, Harrisburg, February 10. Dr. Winfred Overholser, Washington, D. C., spoke on "Some Possible Contributions of Psychiatry to the National Defense." Dr. Clay Ray Murray, New York, discussed "Problem Fractures of the Upper Extremity for the General Practitioner" before the Lycoming County Medical Society, March 13, in Williamsport.

Philadelphia

Special Lectures.—Dr. Edward B. Krumbhaar, professor of pathology, University of Pennsylvania School of Medicine, delivered a public lecture for the College of Physicians of Philadelphia, March 20. His subject was "Superstition and Medical Progress." Dr. Charles Sidney Burwell, dean and research professor of clinical medicine, Harvard Medical School, Boston, will deliver a Mary Scott Newbold Lecture, May 6, on "Studies of the Circulation in Congenital Affections of the Heart and Their Application to Some of the Problems of Heart Disease."

Pharmaceutic Seminar.—The fourth annual seminar on modern pharmaceutical practice will be conducted by the Philadelphia College of Pharmacy and Science, April 6-9. Heretofore the seminar has been of three days' duration, but the national emergency has prompted the college officials to extend

the seminar one additional day to include an official standard Red Cross first aid course. In addition to the first aid instruction, members of the faculty will lecture on such subjects as pharmaceutical economics in war times, the pharmacist's part in war gas defense and the chemistry, pharmacy and therapeutics of the new drugs of the Pharmacopeia which soon becomes official.

Annual Postgraduate Institute.—The Seventh Annual Postgraduate Institute of the Philadelphia County Medical Society will be held at the Bellevue-Stratford Hotel, April 13-17. A symposium on modern therapy will constitute the program. Included among the speakers will be:

Dr. Thomas Grier Miller, The Significance of Nutrition in Relation to National Defense.

Thomas J. Cook, D.D.S., Mouth Lesions Due to Non-Nutritional Disturbances.

Dr. George Harlan Wells, Diabetes Complicated by Tuberculosis.

Dr. James M. Surver, Surgical Emergency Operations on the Diabetic.

Dr. Charles C. Wolfert, The Management of Coronary Disease in the Diabetic.

Dr. Harrison F. Flippin, Recent Advances in Sulfonamide Therapy.

Dr. John S. Lockwood, Surgical Importance of Chemotherapy.

Dr. Bernard J. Alpers, Chemotherapy of Infections of Central Nervous System.

Dr. William G. Leaman Jr., The Management of the Cardiovascular Complications of Anemia and the Deficiency Diseases.

Charles Wesley Scull, Ph.D., Elkins Park, Pa., Pathology and Metabolism of the Arthritides in Relation to Therapy.

Dr. William J. Westcott, Doylestown, Pa., Chemotherapy (Gold) and Endocrine Therapy.

Dr. Morris A. Bowie, Bryn Mawr, Pa., The Use and Abuse of Analgesic Drugs: Indications for and Effects of Physical Therapy.

Dr. Ralph Pemberton, Effective Organization of the Treatment of Arthritides.

Pittsburgh

Stewart Memorial Lecture.—The annual R. W. Stewart Memorial Lecture was delivered in the Pittsburgh Academy of Medicine, March 10, by Dr. Isidor S. Ravdin, George Leib Harrison professor of surgery, University of Pennsylvania School of Medicine. His subject was "Biliary Tract Disease."

SOUTH CAROLINA

Society News.—Dr. Arthur Bruce Gill, Philadelphia, discussed "The Etiology and Treatment of Chronic Backache, with Particular Reference to the Effect of Postural Defects" before the Columbia Medical Society in Columbia, February 9, and Dr. George H. Bunch, Columbia, spoke on "Postoperative Tetanus."—The Marlboro County Medical Society was addressed in Bennettsville, January 7, among others, by Dr. Frank A. Hoshall, Charleston, on "Fractures of the Wrist from the Industrial Standpoint."

Tri-State Associations' New Officers.—Dr. Frank S. Johns, Richmond, Va., was chosen president-elect of the Tri-State Medical Association of the Carolinas and Virginia at its meeting in Greenville, February 23-24, and Dr. George R. Wilkinson, Greenville, was installed as president. Vice presidents are Drs. Walter B. Martin, Norfolk, Va.; Karl B. Pace, Greenville, N. C., and Clay W. Evatt, Charleston, S. C. Dr. James M. Northington, Charlotte, N. C., was reelected secretary-treasurer. The 1943 meeting will be held in Lynchburg, Va.

UTAH

Annual Registration Due April 1.—All practitioners of medicine and surgery licensed to practice in Utah are required to register annually on or before April 1 with the state department of registration and to pay a fee of \$3. If a licentiate fails to reregister within ninety days to six months after April 1 his license can be revoked and, if revoked, it will be reinstated thereafter only on his paying the delinquent registration fees and an additional year's fee as a penalty.

WASHINGTON

Dr. Loewi Appointed to Special Professorship.—Dr. Otto Loewi, research professor of pharmacology at New York University, New York, has been appointed Walker-Ames professor of pharmacology and physiology at the University of Washington, Seattle, for the spring quarter. He will conduct a series of weekly seminars on Tuesday evening, beginning April 14, on the following topics: "The Point of Attack of Autonomic Drugs," "Specific Sensitivity and Hypersensitivity of Denervated Organs," "The Action of Cations," "Problems Connected with the Chemical Transmission of the Nervous Impulse," "Blood Sugar Regulation" and "Questions Related to Hormone Action." Four general lectures, open to the public, will be given as follows: "The Story of the Chemical Mediation of Nervous Activity," April 22; "Drug Action and Drug Discovery," May 6; "Adaptation and Regulation Within the Organism," May 20, and "The Organism as a Unit," May 27.

WYOMING

Annual Registration Due April 1.—All practitioners of medicine and surgery licensed to practice in Wyoming are required by law to register on or before April 1 with the secretary of the board of medical examiners and to pay a fee of \$2.50. If a licentiate fails to pay the fee within three months after April 1, his license can be annulled, and, if annulled, it will be reinstated only on his paying the stated fee plus \$5 as a penalty.

GENERAL

Thoracic Surgeons Cancel Meeting.—The annual meeting of the American Association for Thoracic Surgery, planned for St. Louis May 13-16, has been canceled on account of the war.

Change in Ophthalmology Meeting.—The American Academy of Ophthalmology and Otolaryngology will meet in Chicago, October 11-14, instead of San Francisco as was previously announced. The convention period has been shortened one day, consolidating five days' activities into four.

Applications for Grants for Research.—The Committee on Scientific Research of the American Medical Association invites applications for grants in support of researches on problems more or less closely connected with clinical medicine and public health. For information address the committee at 535 North Dearborn Street, Chicago.

Doctor Needed in Peru.—The Peruvian Inland Mission is urgently in need of a doctor for its hospital at Lamas, Province of San Martin. The director of the mission is Miss Annie G. Soper. The Peruvian government offers the post of "Medico Titular" to a physician who can use Spanish and who is willing to have his medical practice certificate revalidated at an outlay of approximately \$400. The position of "Medico Titular" carries a monthly salary of \$80. Since the work is under a faith mission, it is desired that the applicant be one who comes in a spirit of religious devotion. Apply to Dr. Edward H. Hume, 156 Fifth Avenue, New York.

Contest for the Design of an Emblem.—The American Psychiatric Association has announced a contest for the design of an emblem to be used in the centennial celebration of the association in 1944. Five hundred dollars is available for prizes. Artists, art teachers and students are invited to compete, the drawings to reach the association not later than April 15. Literature to assist in forming a background for the design may be obtained from Dr. Gregory Zilboorg, 14 East Seventy-Fifth Street, New York. Information concerning administrative matters may be obtained from Mr. Austin Davies, executive secretary of the association, 9 Rockefeller Plaza, New York.

Association of Medical Museums.—The thirty-fifth annual meeting of the International Association of Medical Museums will be held at the Washington University School of Medicine, St. Louis, April 1, under the presidency of William H. Feldman, M.S., Rochester, Minn. The headquarters will be at the Chase Hotel. After a business session the program will open with a symposium on comparative pathology. Among the speakers will be: Dr. William O. Russell, St. Louis, on "Experience with Plastic Cover Slips"; Dr. Emmerich von Haam and Mary R. Schuh, Columbus, Ohio, "Cytologic Studies with the Electron Microscope"; Dr. Jacob Werne, Jamaica, New York, "Postmortem Incidence of Tuberculosis in a Population Dying of Violence as Determined by X-Ray and Mechanical Slicing of the Lungs," and Dr. Robert A. Moore, St. Louis, "Rubber Autopsy Sheet."

Meeting of Pathologists and Bacteriologists.—The forty-second annual meeting of the American Association of Pathologists and Bacteriologists will be held at the Washington University School of Medicine, St. Louis, April 2-3. Among the speakers will be:

Clarence C. Lushbaugh, Ph.D., and Dr. Paul E. Steiner, Chicago, Fatal Maternal Pulmonary Embolism by Amniotic Fluid.

Dr. Edward Smith, St. Louis, Adhesions.

Drs. James W. Logie and John W. Logie, St. Louis, Arthro, Mich., Stasis.

Dr. Elexius T. Bell, Minneapolis, The Vascular Changes in the Kidney in Diabetes Mellitus.

Dr. Howard C. Hopps, Chicago, Allergic Reactions to Surgical Catgut—An Experimental Study.

Dr. Jacob Werne, Jamaica, N. Y., Evidence of Acute Infection in Unexpected Death of Infants.

Dr. Howard T. Karsner, Cleveland, Ohio, Evidence of Functional Tumors of Endocrine Glands.

Drs. Ernest M. Hall and Lucile R. Anderson, Los Angeles, The Incidence of Rheumatic Stigmas in Nonrheumatic Hearts.

American Surgical Association.—The annual convention of the American Surgical Association will be held at the Cleveland Hotel, Cleveland, April 6-8, under the presidency of Dr. Harvey B. Stone, Baltimore. The tentative program includes the following speakers:

- Drs. William A. Altemeier Jr. and Burr N. Carter, Cincinnati, Chronic Infected Burns with Hemorrhage.
Dr. Albert O. Singleton, Galveston, Texas, The Problem of Intestinal Gases Complicating Abdominal Surgery.
Dr. Owen H. Wangenstein, Minneapolis, New Operative Technics in the Management of Bowel Obstruction.
Dr. Roscoe R. Graham, Toronto, Ontario, Canada, The Operative Repair of Massive Rectal Prolapse.
Drs. Andre Courmand and Francis B. Berry, New York, Effect of Pneumectomy on Cardiac Pulmonary Function in Adults.
Dr. Charles B. Huggins, Chicago, Treatment of Metastatic Cancer of the Prostate.
Drs. Isidor S. Ravdin and Henry P. Royster, Philadelphia, Reflexes Originating in the Common Duct Giving Rise to Pain Simulating Angina Pectoris.
Dr. John C. Burch and Doris H. Phelps, Ph.D., Nashville, An Experimental Approach to the Problem of Menstrual Disorders.
Dr. Cecil K. Drinker, Boston, Use of Oxygen in the Treatment of Transudation and Exudation into the Lungs.

Congress on Obstetrics and Gynecology.—The second American Congress on Obstetrics and Gynecology will be held at the Municipal Auditorium in St. Louis, April 6-10, under the general chairmanship of Dr. Fred L. Adair, Chicago. One session of the medical section will be devoted to "The Obstetric Use of Vitamin K." Another will be on the endocrines. General sessions will cover chemotherapy, shock and hemorrhage, control of eclampsia, genital cancer and the economics of obstetric care. Evening meetings will be addressed, among others, by Dr. Joseph G. Hamilton, San Francisco, on "Biologic and Medical Applications of Nuclear Physics"; Logan Clendening, Kansas City, Mo., "The Place of Obstetrics in the Various Epochs of the History of Mankind," and Arthur C. Corcoran, Indianapolis, "Renal Aspects of Hypertensive and Eclamptogenic Toxemia." Included among the speakers on the program will be the following:

- Edward A. Doisy, Ph.D., St. Louis, Chemistry and Action of Vitamin K.
Dr. Alexander E. Brown, Rochester, Minn., History and Pharmacologic Aspects of Chemotherapeutic Drugs.
Dr. Lawrence M. Randall, Rochester, Minn., Gonadotropic Hormones.
Dr. Frank W. Hartman, Detroit, Physiology and Pathology of Shock and Hemorrhage.
Dr. Madge T. Macklin, London, Ontario, Canada, Heredity as an Etiologic Factor in Genital Cancer.

One combined session will be held by the medical and educators sections for a study of sterility and infertility. Round table discussions will form a large part of the program.

Association of Anatomists.—The fifty-eighth annual session of the American Association of Anatomists will be held at Cornell University Medical College and the Hotel Commodore, New York, April 1-3, under the presidency of Philip E. Smith, Ph.D., New York, whose address will be "Some Aberrant Responses to Sex Hormones." The program includes the following speakers:

- Melvin H. Knisely, Ph.D., Chicago, and Edward H. Bloch, B.S., Memphis, Tenn., Microscopic Observations of Intravascular Agglutination of Red Cells and Consequent Studding of the Blood in Human Diseases.
Edmond J. Farris, Ph.D., Philadelphia, The Blood Picture of Athletes as Affected by Intercollegiate Sports.
Edgar Allen, Ph.D., New Haven, Further Studies of the Ovaries and Genital Tract At and Shortly After Ovulation.
Frank Harrison, Ph.D., and Dr. Kendall B. Corbin, Memphis, Tenn., Oscillographic Studies on the Spinal Tract of the Trigeminal Nerve.
William H. Whitehead, A.B., Chicago, Changes in Lung Structure During Aspiration of Amniotic Fluid and During Air Breathing at Birth.
Earl W. Count, Ph.D., New York, Growth Pattern of the Human Physique.
Drs. Joseph H. Globus, New York, and Hartwig Kühlenbeck, Philadelphia, The Subependymal Cell Plate and Its Relation to Brain Tumors of Neuroectodermal Derivation.
Walter A. Stultz, Ph.D., Burlington, Vt., Alterations in the Spinal Cord of Amblystoma Following Changes in the Peripheral Field.
Dr. Joseph Krafka Jr., Augusta, Ga., A Free Human Tubal Ovum in a Late Cleavage Stage.
Albert W. Hetherington, Ph.D., Chicago, The Effect of Early Hypophysectomy on Hypothalamic Obesity.

Latin American Program.—A new division of health and sanitation has been created in the Office of Inter-American Affairs, according to the New York Times. Dr. George C. Dunham, director of laboratories, U. S. Army Medical School, Washington, D. C., has been appointed director. He will organize a field staff to carry out whatever arrangements are made between the officials of the United States and the Latin American countries. One project already instituted is a mission to Quito and Guayaquil in Ecuador. According to the Times the mission will concentrate on those areas which are

considered vital in carrying out the defense of the hemisphere. Included on the staff are Dr. Walter C. Earle, member of the field staff, International Health Division, Rockefeller Foundation, New York, and Wyman Stone, sanitary engineer. Among other projects to be undertaken will be the regulation of water supply, waste disposal systems, the building of hospitals in defense areas and the training of sanitation specialists in the Latin American countries. The program will tie in with the activities of the Pan American Sanitary Bureau, the twenty commissions organized in the other American republics under the Inter-American Development Commission and various private foundations, the Times stated.

Society for Pharmacology and Experimental Therapeutics.—The American Society for Pharmacology and Experimental Therapeutics, Inc., will hold its annual meeting in Boston, March 31-April 4, under the presidency of Dr. Eugene M. K. Geiling, Chicago. Among the speakers will be:

- Dr. Robert C. Batterman, New York, Effectiveness in Man of Demerol, A New Analgesic Drug.
Dr. Gerhard Katz, New Orleans, Histamine Release in the Allergic Skin Reaction.
Albert J. Plummer, Ph.D., Boston, Antagonism Between Nicotine and Physostigmine.
Dr. Ko Kuei Chen, Indianapolis, and Robert Cobert Elderfield, Ph.D., New York, Unsaturated Lactones Related to Cardiac Glycosides.

On Wednesday there will be a symposium on "Morphine Problems":

- Dr. Harold G. Wolff, New York, Pain and Its Relief by Morphine and Related Substances.
Dr. Clifton K. Himmelsbach, Lexington, Ky., Present Status of Morphine Addiction Studies.
Dr. Erwin G. Gross, Iowa City, The Fate in the Body of Morphine and Related Substances.
Dr. Maurice H. SeEVERS, Ann Arbor, Mich., The Effect of Morphine and Related Substances on Tissue Metabolism.

At a joint symposium of the Federation of American Societies for Experimental Biology five papers will be presented, one from each of the five component societies. Dr. Ralph M. Waters, Madison, Wis., will deliver the paper for the Pharmacology society on "Newer Viewpoints on Clinical Anesthesia." A symposium on "Deficiency Diseases" Friday afternoon will consist of the following:

- Charles G. King, Ph.D., Pittsburgh, Pa., Some Specific Physiological Disturbances Induced by Marginal Vitamin Deficiencies (C and B₁).
Franklin C. Bing, Ph.D., Chicago, Food as a Source of Vitamins.
Conrad A. Elvehjem, Ph.D., Madison, Wis., The Biological Action of the Vitamins.
Dr. Hans Molitor, Rahway, N. J., Vitamins as Pharmacological Agents.
Dr. Norman H. Jolliffe, New York, Vitamins in the Practice of Medicine.
Dr. William H. Sebrell Jr., Washington, D. C., Vitamins in Public Health.

LATIN AMERICA

Personal.—Dr. Porter J. Crawford, chief of the health work in Central America, Colombia and Venezuela, of the Rockefeller Foundation, arrived in Nicaragua February 18 to confer with Col. Luis Manuel Debayle, director general of the department of health of Nicaragua, on the organization of medical work in case of a national emergency, according to the New York Times.

Society News.—A group of Latin American physicians and scientists met recently in Buenos Aires under the presidency of Dr. Angel H. Roffo, director of the Instituto de Medicina Experimental of Buenos Aires, to organize a Pan American Scientific Confederation for the discussion of scientific Pan American problems.—The eighth Pan American Congress of the Child will meet in Washington, D. C., May 2-9. Miss Katharine F. Lenroot, head of the Bureau of the Child, Washington, D. C., is the president of the organizing committee.

CORRECTIONS

John H. O'Shea.—In THE JOURNAL, February 21, page 638, the name Dr. John M. O'Shea, Spokane, Wash., a member of the Ninth Corps Area committee of Procurement and Assignment, should have been John H. O'Shea.

First Venereal Disease Control Officer in Virginia.—In a news item, February 28, page 745, THE JOURNAL reported that Dr. Aaron Wilson Brown was the first full time venereal disease control officer of Richmond, Va. The announcement was taken from the January issue of the Virginia Medical Monthly. Dr. Francis W. Upshur, Williamsburg, Va., writes that he was the first full time venereal disease control officer in the state, serving from April 1, 1938 to April 15, 1940.

Foreign Letters

LONDON

(From Our Regular Correspondent)

Jan 31, 1942

The British Medical Students Association

The British Medical Students Association is the latest medical organization formed in this country. It dates only from May 1940, though the National Union of Students had previously a medical subcommittee. But only by means of the association has the corporate voice of medical students been heard for the first time. The outbreak of war produced many difficulties for London medical students. To deal with these, chiefly those concerned with evacuation and air raid precautions, a London medical committee of students was formed, and this body called a general meeting of medical students at Manchester, which set up the British Medical Students Association. The following subjects are now under discussion:

1. **Student Health.** While the care of student health in a few hospitals, notably University College Hospital, is extremely good, in many hospitals provision for maintaining the student in health is very poor. There is a report from one small teaching hospital of 7 cases of tuberculosis, of which 1 was fatal, in six months. The council of the association unanimously passed a resolution approving of free medical treatment of all students, which should include both medical attendance and hospital accommodation. Every medical student should be examined on entering his school. Examinations should follow at regular intervals and include roentgenography of the chest.

2. **Air Raid Precautions and Evacuation.** Medical students have a special obligation for air raid precautions and casualties and so were reserved from compulsory military service. There has been considerable friction in fitting the student body into the framework of the local authorities, particularly in the Midlands and the North of England. London students are usually evacuated unless attached to casualty posts. The council holds that teaching standards should be maintained as far as possible in spite of evacuation. To achieve this the hospital system should be more flexible; beds in municipal hospitals should be available for teaching.

3. **Medical Education.** The Medical Planning Committee of the British Medical Association has invited the British Medical Students Association to state its case. A subcommittee was formed for the purpose and has made the following recommendations. No suitable student should be debarred from medicine for financial reasons, and all schools should be open equally to men and to women. In medical education the emphasis should be on the prevention of disease rather than on the cure. Biology should be taught as a general study of life rather than as a detailed study of a few forms. Chemistry and physics should be taught with more emphasis on general principles. The medical course might be widened to include the elements of anthropology, sociology and genetics. The teaching of anatomy and physiology should be coordinated, with more attention to the developmental approach and to surface anatomy. Clinical cases should be used to illustrate anatomic and physiologic principles. Clinical instruction should be organized for small groups rather than for large classes. Hospital education is not enough; it should be supplemented by a system of apprenticeships to selected general practitioners, or a dispensary system such as operates in some Scottish schools. A state medical examination might replace the various examination standards now existing. There should be a substantial reduction in examination fees.

Some of these reforms have already taken place in certain medical schools. What is entirely new is that medical students should criticize the regulations to which they are subject.

BUENOS AIRES

(From Our Regular Correspondent)

Feb 1, 1942

Crusade Against Malaria

A law was passed recently by which malaria is declared a social disease for the control of which all the health centers and authorities should collaborate. The executive power will declare which are the malarial regions of the country. The board of directors of the General Department of Antimalaria Crusade, which is established in Tucuman city as a branch of the Departamento Nacional de Higiene, will establish regional branches and will be in charge of studies and research. The malarial patients who cannot afford medical care and drugs should have both gratis. To facilitate the creation and functioning of new departments in the country and in the small towns with less than five thousand persons, subsidies will be given to provinces and municipalities in the amount of 30 per cent of the total sum of the local budget. There will be a constant and intense crusade for the spreading of education against malaria. The directors of private and official organizations working in malarial regions are obliged to give antimalarial drugs, free of charge, to their employees who have malaria. If the organizations have more than fifty employees the latter should have both medical care and antimalarial drugs gratis. The Departamento Nacional de Higiene will sell antimalarial drugs at low prices to the directors of the organizations. The national department for the control of malaria will carry on work for the destruction of mosquitoes and larvae. Housing in malarial regions is going to be inspected in order to provide the workers with hygienic houses well protected against the entrance of mosquitoes. Factories at a distance of no more than 5 kilometers from small villages have to eliminate stagnant waters. The windows of trains which cross malarial regions should be protected with screens. The owners of farms and industries should make their premises hygienic. If the owners do not institute hygienic measures on their premises after several notifications the place can be closed by order of the government or can be expropriated.

Imported antimalarial drugs will not pay duty. Infraction of the law will be punished. The General Antimalarial Department disposes of a budget of 900,000 Argentine pesos (\$225,000) to carry on the antimalarial crusade. The new law will demand great energy from the provincial hygienic authorities. The law provides for an increase of funds for the antimalarial crusade, from 500,000 Argentine pesos in 1907 to 750,000 at the present time (\$125,000 and \$188,000 respectively). The final plans which aim to suppress endemic malaria will be soon arranged.

Malarial Therapy

A center for malarial therapy was established in 1941 in the Hospicio de las Mercedes in Buenos Aires, a large hospital for the insane. Dr. Gonzalo Bosch is the director of the hospital and Dr. Roque Orlando is director of the malarial center. The strain used at present is the same which was used in 1923 by Drs. Bosch and Mo. It has been maintained at the hospital by means of interhuman transplantations of parasitic blood. The incubation period with this strain varies between five and thirty five days. The paralytic patients first are treated to improve their general condition. Young trophozoites of Plasmodium malariae, belonging to at least the third malarial attack are used for the intravenous inoculation of malaria for eight or ten malarial attacks. In rare cases six or twelve attacks are provoked. Malaria is then interrupted by administration of quinine sulfate by the mouth. The malarial strain presents a normal schizogonic parasitic morphology. The number of plasmodium in the peripheral blood is moderate, whereas gametocytes are rarely

observed. The host erythrocytes are not altered. The strain produces no immunity. One or more plasmodial generations can be suppressed by administering from 0.5 to 2 Gm. of quinine sulfate by mouth ten or twelve hours before the appearance of the highest figures of fever in a given attack. Moderate anemia appears during the period of active malarial therapy. There are anisocytosis and poikilocytosis, moderate polychromatophilia and a loss of hemoglobin. These changes do not provoke the appearance of normoblasts or any other signs of sudden regeneration of the blood but they are the cause of the appearance of bilirubinemia. After malarial therapy the erythropoiesis, hemoglobin and leukocytosis became normal. Erythropoiesis improves through functions of the reticulocytes. The increase of the lymphocytes and eosinophils is both relative and absolute. The administration of iron in large doses by mouth before, in the course of and after malarial therapy attenuates the anemia. Sixty paralytic patients had malarial treatment with this strain of *Plasmodium malariae*. Four patients died.

AUSTRALIA

(From Our Regular Correspondent)

Jan. 17, 1942.

The White Man in the Tropics

The problem of colonization assumes every year a greater importance to Australia. What many writers fail to realize is that conditions in the Australian tropics are widely different from those in territories climatically similar and that in consequence the problems must be solved locally and with little help from experiences in other lands. In all other tropical countries there is a large native population acting as a permanent reservoir of endemic disease and, further, the white man is manager and the white woman is supplied with abundant and cheap colored labor in her home. In Australia north of Capricorn the native population is sparse, endemic diseases have little menace and the whole work of the community is carried out by the white race, manual as well as administrative, unskilled as well as technical. A vast amount of research work has been undertaken in an attempt to disentangle the effects of tropical diseases from the effects of climate. It has also only recently been appreciated that malnutrition plays a much more important part than was previously realized. The shortage of milk and many protective vegetables cannot fail to lower vitality. The most recent contribution to this vexing problem of man in the tropics comes from the Medical School of the University of Queensland. Prof. Douglas Lee in his brochure "A Basis for the Study of Man's Reaction to Tropical Climates" has built up from the various sources available an ordered and concise picture of the way in which the human body reacts to the heat elements in climate. The bulk of the actual material comes from the existing literature, but original research is frequently introduced. Starting from simple physical concepts, the bodily activities have been examined, first singly or in simple groups and then in greater complexity. This is followed by considerations of the body as a whole. Finally the immediate practical applications and significance of the prior studies are discussed with a view to linking the more "academic" and fundamental considerations to the everyday problems with which they are trying to cope. We need still more facts, but Professor Lee has coordinated what facts we have into a more useful and rational conception than has previously existed.

Hydatid Disease in New Zealand

Although figures showing the proportion of hydatid disease to the total number of admissions in public hospitals does show some evidence of comparative diminution, it is clear also that the total number of hydatid cases in New Zealand is slightly increasing. These observations are made by Sir Louis Barnett

in his annual report in the *New Zealand Medical Journal* regarding the incidence of hydatid disease in New Zealand. There is little or no indication of improvement in the tallies of infected sheep and cattle. Undoubtedly it takes a matter of years to get results in hydatid prevention and eradication, but there is a growing conviction that success will never be achieved without legal enforcement of the precautions recommended. While many dog owners do pay heed to the recommendations embodied in the large output of educational material, the unpleasant fact stands out that far more of them do not. In particular they allow dogs to feed on raw offal and they neglect or refuse to dose their dogs with the tapeworm medicine supplied to them. A study of the data justifies the following deductions: 1. About 120 new cases of hydatid disease are treated in New Zealand every year. About 16 of them are fatal. 2. Roughly half of New Zealand's sheep and cattle have livers and lungs infected with hydatid or tenuicollis cysts. 3. A third or more of country dogs harbor the adult parasite *Taenia echinococcus*. 4. The South Island, though only half as populous as the North Island, yet has almost as many cases of hydatid disease. This disproportion is largely due to a particularly heavy infestation in the Canterbury district.

Trachoma Among the New Zealand Maori

The widespread nature of trachoma in New Zealand is not generally realized. There have even been differences of opinion as to whether real trachoma does exist among the Maoris. Swanston, from the Medical School, Otago, has pointed out that trachoma is not only prevalent but also a cause of needless suffering, occasional blindness and great economic loss.

There are several reasons for this lack of realization of the true state of affairs, not the least of which is the apathy of the Maoris themselves. When a Maori becomes infected he takes little notice until his sight is impaired. But perhaps the most important factor is the remoteness of the majority of the Maori population from centers where they can obtain diagnosis and treatment. District nurses take care of most of the medical needs of the Maoris, and if they recognize trachoma at all they treat it simply with drops and ointment. Generally the disease passes undiagnosed and cases are taken with other cases of conjunctivitis, so that medical practitioners never come to hear of them and they are certainly not notified to the health department. Even diagnosed cases are often treated by district nurses without reference to a medical man and without regard to the accepted practice in the treatment of trachoma, namely the vigorous application of a solid copper sulfate stick to the cocaineized lid.

Diagnosis was not attempted in the native schools until this year. Up to one in ten of native children examined were found to be suffering from eye disease. The fact that in a mixed community it is the Maori who becomes infected is perhaps not surprising in view of the unhygienic mode of life of the native race. But it also raises another point, namely racial susceptibility. The origin of trachoma in New Zealand and whether it was introduced by the white man or was already present as a heritage from the far off Eastern derivation of the native race will perhaps never be conclusively settled. It is difficult to discover reference to ophthalmia in Maori legend; but, even if trachoma had been present, reference to it would not be sufficiently specific for it to be recognizable. Nevertheless, with the necessary determination, trachoma could be eliminated in New Zealand within the space of five years. Two things are necessary for an organized attack: a small group of specially trained personnel and the establishment of special clinics. Diagnosis and treatment would be accompanied by adequate education among the Maoris, emphasizing the seriousness of the disease.

Deaths

Charles Alfred Dukes * Oakland, Calif.; Vice President of the American Medical Association, died on March 13 at a local hospital as the result of an intestinal infection, aged 69. Dr. Dukes was born in Numa, Iowa, April 23, 1872, and graduated from the Cooper Medical College, San Francisco, in 1895. For many years he was a visiting surgeon at the Veterans Administration Facility at Livermore, Calif., and he was also a member of the staffs of the Merritt Hospital, the Highland-Alameda County Hospital in Oakland, and the Fairmont Hospital in San Leandro. Throughout his career Dr. Dukes gave freely of himself to public service and to medical organization. In the California State Medical Association he had occupied practically all offices, including that of president. He had been chairman of the Cancer Commission and of the Public Relations Committee. In 1941 he was made a member of the Alameda County Institutions Commission, and in 1942 he was appointed a director of the California Safety Council. In the American Medical Association he had served previously as a member of the House of Delegates from 1933 to 1938 and in 1940. In 1940 he became a member of the Committee on Medical Preparedness and more recently had been made chairman of the Corps Area Committee of the Procurement and Assignment Service for Physicians, Dentists and Veterinarians. He was a member of the American College of Chest Physicians and also a fellow of the American College of Surgeons, of which he was formerly vice president. In every phase of medical activity in California his wise judgment and leadership had been highly prized and in recent years equally in all phases of national concern. Especially in the work of preparedness and of medical service in the war he had given unstintingly of his time, traveling repeatedly from the west coast to Chicago and to Washington to participate in essential conferences.

Casey Albert Wood * Pasadena, Calif., professor of ophthalmology emeritus at the University of Illinois College of Medicine, Chicago, died, January 26, at the Scripps Metabolic Clinic in La Jolla eight weeks after a cerebral hemorrhage, aged 85. Dr. Wood was born in Wellington, Ont., Canada, on Nov. 21, 1856. He was educated in private schools and was graduated from the Ottawa Collegiate Institute in 1874. After graduation from the University of Bishop College of Medicine, Montreal in 1877, he practiced in Montreal and was professor of chemistry and pathology at Bishop College from 1878 to 1885. His early training in ophthalmology was taken at the New York Eye and Ear Infirmary and the New York Post-Graduate Medical School in 1886. Courses at many European clinics followed, and in the years 1888 and 1889 he served as assistant surgeon in several London clinics. In 1890 he located in Chicago, where he served as attending ophthalmic surgeon on the staffs at Alexian Brothers', Passavant Memorial and St. Luke's hospitals. He served as professor of ophthalmology on the faculties of Chicago Post-Graduate Medical School, College of Physicians and Surgeons of Chicago, School of Medicine of the University of Illinois and Northwestern University Medical School. Dr. Wood retired from practice in 1917. In that year he was commissioned a major in the U. S. Army and was assigned to Camp Sherman, Ohio, where he was placed in charge of the eye department at the camp hospital. Later he

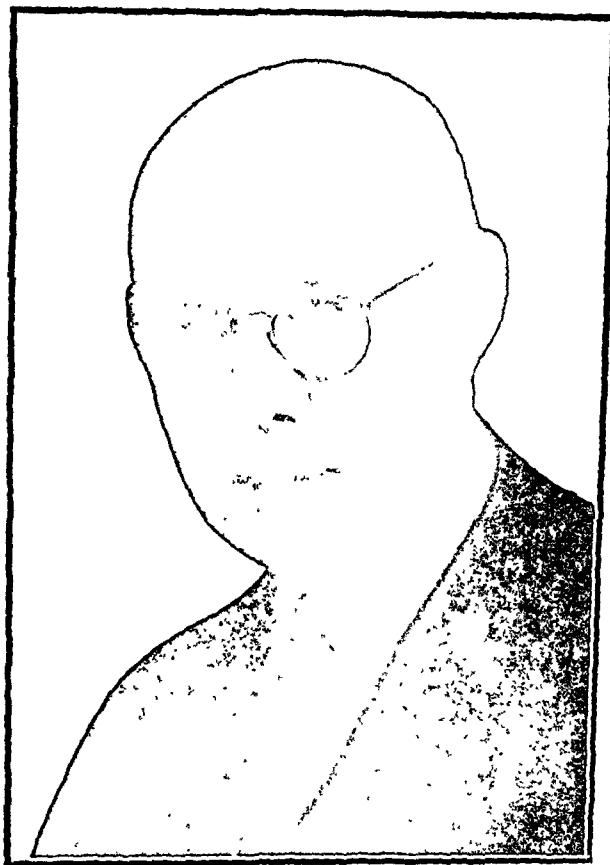
was made lieutenant colonel on the Surgeon General's staff in Washington, D. C., where he worked on the history of World War I. He retired with the rank of colonel in the Medical Reserve, United States Army. During 1898 and 1899 he was chairman of the Section on Ophthalmology of the American Medical Association and in 1904 a member of the House of Delegates. He served as president of the American Academy of Ophthalmology and Otolaryngology and of the Chicago Ophthalmological Society. He was a member of the Illinois State Medical Society, founding fellow of the American College of Surgeons and of the Institute of Medicine of Chicago. From 1894 to 1901 he served as editor in chief of the *Annals of Ophthalmology*, and from 1902 to 1908 he held the same position on the *Ophthalmic Record*. The latter journal was merged with others to form the *American Journal of Ophthalmology*, and he served the new publication as editor in chief from 1908 to 1914. He published many articles in his special field as well as many translations of treatises on the eye. He

was the author of "A System of Ophthalmic Therapeutics," "A System of Ophthalmic Operations" and "The American Encyclopedia of Ophthalmology." He was the co-author with T. A. Woodruff of "Commoner Diseases of the Eye." After World War I Dr. Wood spent two years in British Guiana studying the eyes of birds and reptiles. During the succeeding years he pursued his studies in various countries of the Far East. Thereafter until two years ago he resided in Rome, Italy, and continued the translation of foreign language works on ophthalmology. His collection of books on ornithology and his medical library, together with rare books on ophthalmology collected during his travels, were given to McGill University, Montreal, Que., Canada, where he received the honorary doctor of medicine in 1906 and the doctor of laws in 1921.

Henry Dawson Furniss * New York; University of Virginia Department of Medicine, Charlottesville, 1899; in 1913 member of the House of Delegates of the American Medical Association; professor of obstetrics and gynecology at the New York Medical College; formerly professor of gynecology at the New York Post-Graduate Medical School, Columbia University; member of the American Association of

Obstetricians, Gynecologists and Abdominal Surgeons, Southern Surgical Association and the American Urological Association; fellow of the American College of Surgeons; attending obstetrician and gynecologist, Flower and Fifth Avenue hospitals; visiting surgeon, Metropolitan Hospital; consulting gynecologist, New York Post-Graduate Hospital, Broad Street Hospital, New Rochelle (N. Y.) Hospital, St. Luke's Hospital, Newburgh, N. Y., Holy Name Hospital, Teaneck, N. J., Hackensack (N. J.) Hospital and the All Soul's Memorial Hospital, Morristown, N. J.; consulting cystoscopist, New York Infirmary for Women and Children; served during the World War; aged 63; died, January 25, of coronary occlusion.

Herbert Fox * Philadelphia; University of Pennsylvania Department of Medicine, Philadelphia, 1901; professor of comparative pathology at his alma mater since 1927; member of the American Pathologists and Bacteriologists, American Society of Clinical Pathologists, if Physicians of Philadelphia; chief of the state department of health laboratories from 1906 to 1911; pathologist, Rush Hospital for Consumption and Allied Diseases; pathologist, Children's Hospital, from 1915 to 1926; pathologist, Philadelphia Zoological Society; served as chief of the cantonment laboratory at Camp Zachary Taylor, Louis-



CHARLES ALFRED DUKES, M.D., 1872-1942

ville, Ky., during the World War; director of the William Pepper Laboratory of Clinical Medicine at the Hospital of the University of Pennsylvania; author of "Elementary Bacteriology and Protozoology" and "Disease in Captive Wild Mammals and Birds"; co-author with Dr. Alfred Stengel of the eighth edition of "Textbook of Pathology"; aged 61; died, February 27, of coronary thrombosis.

Claud R. G. Forrester • Chicago; Bennett Medical College, Chicago, 1902; formerly professor of osteology at his alma mater, which is now known as Loyola University School of Medicine, where he was clinical professor of surgery; fellow of the American College of Surgeons; for three years a member of the Illinois Naval Reserve, and during the World War served as major with the British Army; on the attending surgical staff of the Chicago Memorial and Edgewater hospitals and on the attending staff of St. Joseph Hospital; aged 61; died, February 27, at his farm in Garden, Mich.

Robert Livingston Loughran, Sharon, Conn.; Columbia University College of Physicians and Surgeons, New York, 1899; at one time professor of otolaryngology at the New York Post-Graduate Medical School; served during the World War; member and formerly secretary of the American Laryngological, Rhinological and Otolological Society; fellow of the American College of Surgeons; formerly on the staffs of Lying-in Hospital and the New York Post-Graduate Hospital, New York; aged 68; died, January 27, of coronary thrombosis.

Max William Jacobs • St. Louis; Washington University School of Medicine, 1905; assistant professor of clinical ophthalmology at his alma mater; past president of St. Louis Ophthalmic Society; member of the American Academy of Ophthalmology and Otolaryngology; assistant ophthalmologist, Barnes, St. Louis Children's and St. Louis Maternity hospitals; on the staff of the Jewish Hospital; aged 62; died, January 9, of coronary thrombosis.

Clinton Austin Kane, Elkton, Md.; Jefferson Medical College of Philadelphia, 1903; member of the Medical and Surgical Faculty of Maryland; county health officer; formerly member of the state board of health of Virginia; served during the World War; aged 61; died, Dec. 27, 1941, at Perryville, of carcinoma of the bladder.

Walter Whitman Hendee • North Vassalboro, Maine; College of Physicians and Surgeons, Boston, 1914; served during the World War; formerly member of the school board; aged 52; died, January 13, in the Veterans Administration Facility, Togus, of adenocarcinoma of the liver, lung, pleura and ribs.

Charles Edward Sceleth • Chicago; Rush Medical College, Chicago, 1896; served during the World War; formerly medical superintendent of the House of Correction and Sceleth Emergency Hospital; aged 68; died, January 19, in the Albert Merritt Billings Hospital of bronchogenic carcinoma.

Luther Bayne Holmes, Moorefield, Ky.; Louisville and Hospital Medical College, 1908; member of the Kentucky State Medical Association; aged 57; died, January 25, in the Good Samaritan Hospital, Lexington, of pneumonia following a cholecystostomy.

Chester Horton Longacre, Lincoln, Neb.; University of Louisville (Ky.) Medical Department, 1908; member of the Nebraska State Medical Association; aged 58; died, Dec. 8, 1941 in the Clarkson Memorial Hospital, Omaha, of pulmonary embolism.

Bush McLaughlin, Dalzell, S. C.; University of Virginia Department of Medicine, Charlottesville, Va., 1890; University of Maryland School of Medicine, Baltimore, 1891; aged 75; died, Dec. 20, 1941, of injuries received in an automobile accident.

Peter Thomas Geyerman, Hot Springs, S. D.; University of Minnesota College of Medicine and Surgery, Minneapolis, 1899; member of the South Dakota State Medical Association; aged 67; died, January 3, of cerebral hemorrhage.

Ranney Yale Lyman, Chicago; Northwestern University Medical School, Chicago, 1940; Elizabeth J. Ward fellow in radiology at his alma mater; aged 33; died, Dec. 22, 1941, at his home in Helena, Mont., of chronic hepatitis.

Herbert Alonzo Copsey • Alliance, Neb.; Lincoln Medical College of Coter University, 1906; fellow of the American College of Surgeons; on the staff of St. Joseph's Hospital; aged 61; died, January 14, of heart disease.

Wade Hampton Bynum, Germantown, N. C.; University College of Medicine, Richmond, Va., 1900; member of the Medical Society of North Carolina; aged 82; died, January 10, of heart disease.

C. D. D. M. M. S. Langrall, Arcadia, Neb.; Ensworth Medical College, St. Joseph, Mo., 1901; member of the Nebraska State Medical Association; aged 66; died, Dec. 26, 1941.

Woodburne Roszel Avis, New Haven, Conn.; College of Physicians and Surgeons, Baltimore, 1894; aged 75; died, Nov. 16, 1941, of cerebral hemorrhage and arteriosclerosis.

Frank West Coile, Winterville, Ga.; Atlanta Medical College, 1891; member of the Medical Association of Georgia; aged 77; died, Dec. 14, 1941, of coronary occlusion.

James Anderson Burks, Benton, Ark.; College of Physicians and Surgeons, Little Rock, 1910; member of the Arkansas Medical Society; aged 66; died, Dec. 20, 1941.

Patrick John Rowan, Pittsburgh; College of Physicians and Surgeons, Baltimore, 1885; aged 81; died, Nov. 19, 1941, of coronary thrombosis and arteriosclerosis.

Albert Stanley Freedman, Scranton, Pa.; University and Bellevue Hospital Medical College, New York, 1907; aged 58; died, Nov. 15, 1941, of coronary occlusion.

Quinter Olen Gilbert • Oakland, Calif.; University of Michigan Department of Medicine and Surgery, Ann Arbor, 1914; aged 58; died, Dec. 3, 1941.

Rikita Honda, Los Angeles; Chiba University of Medicine, Japan, 1918; member of the California Medical Association; aged 48; died, Dec. 14, 1941.

Frank W. Vance, Memphis, Tenn.; Memphis Hospital Medical College, 1881; aged 80; died, Nov. 22, 1941 in Bolivar of bronchopneumonia.

William Brady Ritter, Erie, Pa.; Kentucky School of Medicine, Louisville, 1893; aged 79; died, Nov. 27, 1941, of cerebral hemorrhage.

Condie Butler Beck, Rising Sun, Ind.; Kentucky School of Medicine, Louisville, 1893; aged 73; died, January 23, of coronary occlusion.

Frew Albertis Tucker, Iowa City; Hahnemann Medical College and Hospital, Chicago, 1899; aged 72; died, Dec. 20, 1941, of carcinoma.

Paul Zotique Hebert, Los Angeles; McGill University Faculty of Medicine, Montreal, Que., Canada, 1872; aged 92; died, Dec. 3, 1941.

George Northrup Jack • Buffalo; University of Buffalo School of Medicine, 1895; aged 72; died, January 12, of cerebral hemorrhage.

John Joseph Stack, Los Angeles; Harvard Medical School, Boston, 1907; served during the World War; aged 57; died, Nov. 25, 1941.

Thomas H. Conarrore, Philadelphia; Hahnemann Medical College and Hospital of Philadelphia, 1893; aged 69; died, Dec. 18, 1941.

August C. Busch, Cincinnati; Medical College of Ohio, Cincinnati, 1894; chairman of a draft board; aged 70; died, Dec. 28, 1941.

James Douglas MacLean, Edmonton, Alta., Canada; Trinity Medical College, Toronto, Ont., 1900; aged 70; died, Nov. 26, 1941.

William Odell Dyer, Oxford, Wis.; Detroit College of Medicine, 1894; aged 74; died, Nov. 24, 1941, of carcinoma of the stomach.

Tasso O. Felix, Downs, Kan.; Marion-Sims College of Medicine, St. Louis, 1898; aged 80; died, Dec. 12, 1941, in Denver.

Joseph W. Taylor, La Mesa, Calif.; University of Wooster Medical Department, Cleveland, 1872; aged 93; died, Nov. 25, 1941.

Atlas Thompson Hembree, Windor, Calif.; Cooper Medical College, San Francisco, 1905; aged 71; died, Dec. 28, 1941.

John M. H. Blau, Louisville, Ky.; Medical College of Ohio, Cincinnati, 1881; aged 82; died, Nov. 29, 1941.

DIED IN MILITARY SERVICE

Henry Hansford Ward, Miami, Fla.; University of Tennessee College of Medicine, Memphis, 1933; was called to active duty on July 14, 1941, as a first lieutenant in the medical reserve corps of the United States Army; was stationed at the 33d Surgical Hospital, Fort Oglethorpe, Ga.; aged 35; died, January 20, of staphylococcus aureus septicemia.

Correspondence

APPLICATION OF SULFONAMIDE SOLUTIONS TO NOSE

To the Editor—Dr. Russell Fletcher (*THE JOURNAL*, Oct 4, 1941, p 1204) has cautioned against the local application of sulfonamide drugs on chronically inflamed sinuses. His view is based on his own experience with an unusual case of odontogenic antritis and also on an opinion by Dr. M. L. Tainter, a pharmacologist, who stressed the caustic action of these drugs and ascribed this effect to their alkalinity.

Briefly, Dr. Fletcher's case revealed an extremely foul exudate emanating from a fistulous tract in the mouth. Osteomyelitis in the vicinity of the tooth socket was present with loosening of the adjacent tooth. Frequent irrigations of the usual kind were of no avail and the use of 5 to 10 per cent sodium sulfathiazole in physiologic solution of sodium chloride—according to the procedure of Dr. I. M. Turnbull of Los Angeles—was instituted. However, surgical intervention finally had to be instituted and revealed widespread necrosis. Separation from viable tissue was extremely difficult, but recovery was uneventful.

This record recalled a special series of patients with odontogenic maxillary sinusitis whom I have observed. They never had been treated with any of the sulfonamides. The characteristic features of the group consisted of a primary microscopic dental focus while the inflammatory process involved either the buccal or the antral mucosa or both. Typically, the primary lesion was a chronic osteomyelitis while the secondary extension—the 'acute exacerbation'—was characterized by rapid extension, more especially along the inner than the outer aspect of the bone wall, with eventual final progression to the nasal wall.

It seems to be insufficiently known that thus far no variety of conservative treatment has effected a cure even after eradication of the primary focus but rather that a radical procedure on the antrum with removal of all necrotic tissue is essential and will promptly induce healing.

The instance that Dr. Fletcher reports fits well into this group of cases of odontogenic chronic antritis. In my opinion Dr. Fletcher's case is poorly chosen to decide a question which is of enormous therapeutic importance. The physician is familiar with surgical infections which are said to be favorably influenced by the local application of these drugs. The tolerance of the mucous membranes toward these drugs, furthermore, has not yet been sufficiently studied to contraindicate their use on the basis of 1 case. However, Dr. Fletcher's point should serve as a caution in the evaluation of results of the subsequent investigations in this field; in my opinion the discontinuance of topical drug therapy on the basis of Dr. Fletcher's experience, on the other hand, would be founded on an erroneous conclusion.

WALTER D. KILSLAND, M.D., New York

NOTE—The communication was referred to Dr. Fletcher, who replies:

To the Editor—I am glad to have this comment, which is clear and decidedly to the point. I agree that conclusions should not be far reaching when they are based on 1 case. The reason I recorded my observations in this communication was that I had an unusual sequence of events, and the most likely cause to which I could attribute my results was the fact that I had used the sodium salt of sulfathiazole.

As this commentator states, this is a typical case of a foul infection of the antrum resulting from dental infection and extraction. This is a rather common experience that all ear, nose and throat specialists frequently see, and it is also a common occurrence for exodontists in the dental field. It is

common to see necrosis and a large amount of destruction in the antrum in such cases. The unusual part of this particular case was the fact that neither the exodontist, who is a specialist in this field and who has a large practice, nor I had ever seen a case in which the lining membrane of the antrum was so completely charred or destroyed as in this case. It did not seem to be a simple necrosis. The lining of the antrum had been replaced or at least covered by a black substance that looked like clay.

As neither of us had ever seen such a condition, in spite of the fact that both of us have seen many cases of antrum infection following a tooth extraction, I consulted the pharmacologist Dr. Tainter of Stanford University. From him I learned that the sodium salts of all the sulfonamide drugs are extremely alkaline and that the caustic action of this particular solution could have been severe enough to cause the burning or charring of this membrane. Prior to that time I had not realized how caustic the sodium salts of this drug were, and I therefore felt that it was important to warn all physicians who were using the sodium salts of this drug that the drug was highly alkaline (in fact it has a pH of 10 to 11).

As to whether the sodium salts of this drug or any other medication should be used in such cases I did not try to say. It may be possible that in the future either a strong acid or a strong base such as sodium hydroxide will be used in cases such as these, however, I do know that most physicians with whom I have spoken regarding the drug had no idea how caustic this particular drug was. I felt therefore that they should be warned accordingly. If a physician wishes to use 10 per cent sodium hydroxide he can do so, but he should realize what the reactions will be before doing so.

RUSSELL FLETCHER, M.D., San Francisco

THE CAUSE OF CHRONIC NEPHRITIS

To the Editor—In reading the paper on "Treatment of Acute Nephritis" by Drs. Francis D. Murphy and Bruno J. Peters (*THE JOURNAL*, January 17) we were surprised that mention was not made, in discussing the etiology, diagnosis, treatment and prognosis, of obstructing lesions in the ureter, at the vesical neck or in the urethra.

It is difficult for a urologist to understand how it could be that some of the 205 patients in their study did not have an obstructing lesion which played a part in making the kidney vulnerable for the toxic agent that brought on the acute glomerular nephritis.

Drs. Murphy and Peters say "Why some patients who have recovered from acute nephritis are completely healed and others progress gradually into the stage of chronic nephritis is an unsolved problem." Might not an obstructing lesion be at least one of the factors which caused 43 per cent of their patients to have a persisting "latent or chronic nephritis"?

Hydronephrosis, slight or considerable in extent, may be present without pain or symptoms directing attention to the existence of this condition.

Might not an obstruction be the reason that "the prognosis was found to be no better when the initial stage was mild than when it was severe or stormy"?

EDGAR G. BALLENGER, M.D.

HAROLD P. McDONALD, M.D.

Atlanta, Ga.

NOTE—This communication was referred to Dr. Murphy, who replies:

To the Editor—Obviously our confession of lack of exact information concerning the factors which may influence chronicity leaves us in no position to reject a practical suggestion. However, before we accept the view that obstructive lesions play an important role in retarding the healing of nephritis, as

mentioned in the communication, it would seem necessary not only to observe such lesions in a series of cases of unhealed nephritis but to show that such lesions impaired healing. We are not aware of this kind of a study. In too few of our cases to settle the point in question urologic investigations were made and no obstructive lesions were found. It is not contended that they were searched for, but since the work was done by competent urologists we do not believe that significant lesions were overlooked.

Since obstructive lesions are not infrequently found in pyelonephritis, their presence would bring to mind the difficulty that is sometimes encountered in differentiating pyelonephritis from glomerulonephritis. This does not mean that obstructive lesions may not play a part in glomerulonephritis, but if they do their presence and importance have not been duly emphasized.

FRANCIS D. MURPHY, M.D., Milwaukee.

METRIC VS. ENGLISH MEASUREMENTS

To the Editor:—The following sentence is from a recent article appearing in the proceedings of one of our large clinics: "During the 200 mile (322 kilometer) drive he became steadily worse and by noon somewhat stuporous." The conversion of miles into kilometers seems to me to be quite unnecessary and, in fact, annoying. It does bring up the subject, somewhat indirectly, of the use of the metric and other systems in medical practice and the report of cases.

Like a great many physicians, I approve of the metric system in prescription writing, although I rarely use it. I suggest that in the printing of prescription blanks there be printed in the lower left hand corner a table such as the following:

Grains	Gm. or Cc.
$\frac{1}{500}$	0.0004
$\frac{1}{200}$	0.0005
$\frac{1}{100}$	0.0006
$\frac{1}{6}$	0.011
$\frac{1}{4}$	0.016
1	0.065
15	1.0
60 (1 drachm)	4.0
1 oz.	32.0

By forcing ourselves to convert the apothecary measure into the metric equivalent no doubt within a reasonable time we would be able to write the metric system without first thinking of its equivalent. And certainly the reading of modern medical articles would be easier.

In short measurements such as those of chest and heart widths and proctoscopic distances centimeters appeal to me more than inches, but for a person's height I must use feet and inches. Likewise I prefer pounds to kilograms. Here too a change in thinking could be effected. Manufacturers should be asked to provide medical scales with both pound and kilogram markers, and height indicators with centimeters as well as inches. In the meanwhile, a home made conversion table for kilograms and centimeters could be put on the wall or attached to the scales.

Further on in the article that I was reading occurred the expression "2½ ounces (74 cc.)." This conversion could be omitted, since in liquid measurements (excepting prescriptions) most physicians have become quite conversant with cubic centimeters. In fact it is more natural to say 300 cc. of blood than 10 ounces. This is one part of the metric system, thanks to syringes and ampules, which we seem to have mastered. There are, of course, some physicians who are quite well versed in ounces, quarts and even fifths of gallons.

When it comes to clinical thermometers, I can see no advantage of the Centigrade over the Fahrenheit. To me it is almost as annoying to be told that 102 F. is so and so C. as to be told that 200 miles equal 322 kilometers.

ALAN R. ANDERSON, M.D., Freeport, L. I., N. Y.

VITAMIN K FOR THE NEWBORN

To the Editor:—In a recent issue of THE JOURNAL (February 28, p. 697) Dr. Sanford and his associates published an article with the important title "Is Administration of Vitamin K to the Newborn of Clinical Value?" One looks in vain, however, for a straightforward answer to this question in their paper. From their emphasis that hemorrhagic manifestations in their series were as frequent in the infants treated with vitamin K as in the untreated controls, it may be surmised that they are doubtful concerning the efficacy of vitamin K in the prevention of the hemorrhagic disease of the newborn.

The question that these authors have raised deserves serious consideration, since it involves the potential safety of many newborn babies. I feel that enough clinical results have been reported to answer the question unequivocally and emphatically in the affirmative.

There is obviously still some misunderstanding as to what constitutes hemorrhagic disease of the newborn. The condition may be defined as a clinical entity, occurring during the first week of life, which is usually self limited but may be fatal. It is recognized by external and internal bleeding and by an exceedingly low prothrombin content of the blood, which is promptly restored to normal through vitamin K. Not all bleeding observed in young infants is, however, due to hypoprothrombinemia. Unfortunately the hemorrhagic diseases are still plagued by the widely accepted fallacy that the coagulation of blood is synonymous with hemostasis. It is necessary to emphasize that the vascular contractive response to injury is equally, if not even more, important in the protective reaction against hemorrhage. Likewise, clot retraction, platelet agglutination and other factors play a part in this defense mechanism. Thus babies born of mothers with thrombopenic purpura may show a transient purpuric type of bleeding.

There can be no doubt that many cases of serious or uncontrolled hemorrhage can be traced to injury of large vessels which may be so extensive that the hemostatic defense, even though normal, is unable to cope with the bleeding. Thus, in 4 cases reported by Dr. Sanford and his associates in which death from cerebral hemorrhage occurred, tentorial tears were found. The delicate blood vessels of the baby are easily injured and massive hemorrhage immediately occurs.

The facts just enumerated do not invalidate the importance of the hypoprothrombinemic bleeding of the newborn. Diminution of plasma prothrombin as a cause of bleeding is no longer questioned. Drs. Bancroft, Stanley-Brown and I, as early as 1934, reported that the bleeding in jaundice was due to a low prothrombin level, and in 1936 I demonstrated that, when the prothrombin in chicks and rabbits was reduced to a certain level, spontaneous hemorrhages occurred. All now agree that the prothrombin of most infants not treated with vitamin K drops (sometimes to low levels) during the first week. It is logical to suspect that this hypoprothrombinemia should lead to hemorrhage, and this is supported by the fact that the time of the highest incidence of hemorrhage coincides with the period of low prothrombin level.

Most convincing, however, are the actual recorded cases in which a low prothrombin level was found and the bleeding promptly stopped after the administration of vitamin K. I have seen 1 case in which practically the whole scalp was lifted by an extensive hematoma and there was active bleeding from a forceps cut. Administration of vitamin K promptly stopped the hemorrhage, and a complete recovery resulted. Recently I have seen an infant 3 months old suffering from malnutrition and gastroenteritis, who began passing blood in the stools. The prothrombin level was found to be 6 per cent. Synthetic vitamin K intravenously promptly stopped the hem-

orrhage and elevated the prothrombin level. In the face of such evidence, one must conclude that prothrombin deficiency, whether it occurs in babies or in adults, brings about a hemorrhagic tendency and that the hypoprothrombinemic period following shortly after birth is potentially dangerous.

In regard to cerebral bleeding, it is clear that vitamin K will have little or no effect if the tentorium is torn or a large cerebral or meningeal artery is severed. This type of cerebral bleeding manifests itself soon after birth, but there is a second form which appears in babies who are normal for several days before signs of intracranial bleeding are noted and who at autopsy show no serious injury of any large blood vessel. It is the latter form that one hopes will be benefited or prevented by vitamin K. It is well to remember, however, that vitamin K will never be a substitute for obstetric skill and gentleness in manipulation and handling of the newborn.

If the aim of Dr. Sanford and his associates in presenting their paper is to emphasize that hemorrhages in the newborn can occur from causes other than prothrombin deficiency, they are serving a laudable purpose; but, on the other hand, if they are attempting to depreciate the value of vitamin K in preventing and curing the hemorrhagic disease of the newborn one is forced for the sake of the newborn baby to take sharp issue with them.

ARMAND J. QUICK, M.D.

Marquette University School of Medicine, Milwaukee.

Medical Examinations and Licensure

COMING EXAMINATIONS AND MEETINGS

UNITED STATES PUBLIC HEALTH SERVICE

Examination. Assistant Surgeon (medical only), commissioned corps. Examinations will be held as follows:

U. S. P. H. S. Hospital, Fort Worth, Texas.....March 27
U. S. Marine Hospital, New Orleans.....March 30
Liaison Office, U. S. P. H. S., Room 319, Grant Bldg., Atlanta, Ga.March 31
Apply Surgeon General, U. S. P. H. S., Washington, D. C.

BOARDS OF MEDICAL EXAMINERS

BOARDS OF EXAMINERS IN THE BASIC SCIENCES

Examinations of boards of medical examiners and boards of examiners in the basic sciences were published in THE JOURNAL, March 14, page 918.

NATIONAL BOARD OF MEDICAL EXAMINERS

NATIONAL BOARD OF MEDICAL EXAMINERS: *Parts I and II.* Various centers, June 22-24. *Part III.* Various centers, June. Exec. Sec., Mr. Everett S. Elwood, 225 S. 15th St., Philadelphia.

EXAMINING BOARDS IN SPECIALTIES

AMERICAN BOARD OF DERMATOLOGY AND SYPHILOLOGY: *Oral.* Groups A and B. Cleveland, Jan. 14-15, 1943. Final date for filing application is Dec. 7. *Written.* Various centers, Nov. 16. Final date for filing application is Oct. 5. Sec., Dr. C. Guy Lane, 416 Marlboro St., Boston.

AMERICAN BOARD OF INTERNAL MEDICINE: *Oral.* St. Paul, April, in advance of the meeting of the American College of Physicians and Philadelphia, June, in advance of the meeting of the American Medical Association. Application should be on file 6 weeks in advance of the date of oral examination. *Written.* Oct. 19. Final date for filing application is Sept. 1. Sec., Dr. William S. Middleton, 1301 University Ave., Madison, Wis.

AMERICAN BOARD OF NEUROLOGICAL SURGERY: *Oral.* New York, May 12-13. Sec., Dr. R. Glen Spurling, 404 Brown Bldg., Louisville, Ky.

AMERICAN BOARD OF OPHTHALMOLOGY: *Oral.* Baltimore, June 6 and Philadelphia, June 8. Sec., Dr. John Green, 6830 Waterman Ave., St. Louis.

AMERICAN BOARD OF ORTHOPAEDIC SURGERY: *Oral and Written.* Chicago, Jan. 9-10. Final date for filing application is Nov. 1. Sec., Dr. Guy A. Caldwell, 3503 Prytania St., New Orleans.

AMERICAN BOARD OF PEDIATRICS: *Written.* Locally, Sept. 18. *Oral.* Chicago, Nov. 2-3. Final date for filing application is July 1. Sec., Dr. C. A. Aldrich, 707 Fullerton Ave., Chicago.

AMERICAN BOARD OF PSYCHIATRY AND NEUROLOGY: New York, December. Final date for filing application is Oct. 1. Sec., Dr. Walter Freeman, 1028 Connecticut Ave. N.W., Washington, D. C.

AMERICAN BOARD OF RADIOLOGY: *Oral.* All Groups. Atlantic City, June 4. Final date for filing application is April 1. Sec., Dr. Byrl R. Kirklin, 102-110 Second Ave., S. W., Rochester, Minn.

Bureau of Legal Medicine and Legislation

MEDICOLEGAL ABSTRACTS

Malpractice: Liability of Physicians of Health Foundation.—The defendant National Health Foundation was a voluntary association which contracted with its members to furnish certain medical services, for which the members paid a monthly premium to the foundation. The trustee of the foundation was authorized to employ a medical director who, with such assistants as he might designate, was to furnish all the medical services contracted for by the foundation. The defendant, Dr. Eugene Carbaugh, was appointed medical director, and the defendants, Dr. Glenn C. Carbaugh and Dr. J. Earle Donaldson, were designated as his assistants. The three physicians, the foundation and the trustee occupied the same office space and their respective telephone numbers were identical. A member desiring medical attention would call that number. If no specific physician was requested the trustee would assign any one of the three to the member. The plaintiff was a member in good standing of the foundation from Jan. 8, 1938, to Feb. 15, 1938. Subsequently she sued the three physicians, the foundation and the trustee for damages alleged to have been caused by the defendants' joint and several negligence. From a judgment for the plaintiff, the defendants appealed to the Kansas City court of appeals, Missouri.

When the plaintiff went to the offices of the foundation on Jan. 8, 1938, she requested the services of Dr. Glenn Carbaugh. She complained of general lassitude and of soreness in the wrists. He found her throat irritated, prescribed medicine for her to take and recommended that she have her tonsils out within a few weeks. She returned to her home, went to bed and followed the physician's instructions. The soreness in her wrists increased, however, and spread to her shoulders, through her body and down to her feet. Her limbs swelled conspicuously and she continued to have a temperature and to remain drowsy and "dopey." At times the pain was so severe that she became almost hysterical. On January 12 the physician was called and he visited her at her home. He told her to continue taking the medicine that he had prescribed and said that she would just have to wear the disease out. The swelling became more pronounced and black blotches began to appear on her body and limbs. She could not bear the weight of bedclothes. After numerous calls to the foundation, Dr. Donaldson finally visited the plaintiff on the 20th. He made no examination of the plaintiff but merely asked her how she felt and prescribed more medicine for her to take. Two days later, Dr. Eugene Carbaugh visited the plaintiff in response to a telephone call by the plaintiff's husband, who described the plaintiff's condition in detail. This physician also told the plaintiff to continue taking the same treatment. Quoting from the decision:

Her condition grew progressively worse until the 29th, when she was unable to feed herself. Her arms and legs were immobile except when moved by some other person. Her pain was such that she cried. It took her fifteen minutes to be taken a few feet to the bathroom. The black blotches had increased in number and size. Her limbs and arms were swollen greatly. She could eat but little. She was in a drowsy semicomatose almost all of the time. In the meantime none of defendant's doctors had called nor had plaintiff been advised at any time by any of them that they would not call, nor that they had quit the case. Neither had the foundation called or sent any other doctor, or offered so to do.

It was then that the plaintiff's husband requested Dr. Laurenzana, a physician not associated with the foundation, to take charge of the case. Dr. Laurenzana examined the patient carefully, caused a blood count to be made and took a throat smear for microscopic examination. His diagnosis was hemolytic streptococcus infection caused by a throat infection, and he prescribed sulfanilamide and a light ray treatment. Within five days the plaintiff responded to the treatment and eventually virtually recovered.

At the trial Dr. Laurenzana, called as a witness by the plaintiff, testified that, judging from plaintiff's condition on Jan-

uary 29, a proper examination should have caused a suspicion of the existence of the streptococcic infection as early as January 8 and should certainly have confirmed that suspicion by the 19th. He also stated that if the plaintiff's true condition had been discovered at the outset, and the proper sulfanilamide treatment administered, she would not have gotten into the serious condition in which he found her on January 29 and would have had a complete recovery much sooner than she did. In conclusion, he stated that a person with the symptoms that the plaintiff exhibited should have been under daily observation so that an early diagnosis could have been reached and proper treatment given.

The defendants contended, among other things, that each of the defendant physicians exercised his own independent judgment and that therefore one was not liable for any errors of the others. The court held, however, that the evidence showed the existence of a joint and common enterprise. The physicians were working for a common employer and for a common purpose, they were associated in the same office and each had knowledge of what the others had done or were doing. The defendants also urged that the foundation was not liable for any negligence of the individual defendants. The court pointed out that the plaintiff had relied on her contract with the foundation and, when she became dangerously ill, the foundation's agents not only failed to perform the contract properly but eventually completely abandoned it. Furthermore, the resulting damage to the plaintiff was readily foreseeable. Hence the court held that the negligence of the medical director and his assistants was chargeable to the foundation.

As to the liability of the individual defendants, the court ruled separately regarding each. The law requires every physician, said the court, to possess adequate skill and care for the practice of his profession. The plaintiff did not argue that the defendants failed to possess that degree of efficiency necessary but contended that the defendants were negligent in failing to apply it. The court held that the evidence fully sustained that contention. Dr. Glenn Carbaugh, said the court, was negligent in assuming the care of the plaintiff and then completely abandoning her when she was in a critical condition. Dr. Donaldson, having assumed the care of the plaintiff, was negligent in failing to make an adequate examination and in blindly adopting the erroneous diagnosis of Dr. Glenn Carbaugh when the plaintiff's serious condition was clearly visible to any one; and he, too, was liable for abandoning the case. Dr. Eugene Carbaugh was liable for adopting a wrong diagnosis by another physician, for making no adequate examination on his own behalf and for withdrawing from the case without notifying the plaintiff. In conclusion, the court held that the negligence of the defendant physicians was concurrent and that the defendant physicians were therefore jointly and severally liable for the plaintiff's damages. Judgment for the plaintiff against all the defendants was accordingly affirmed.—*Baird v. National Health Foundation, 144 S. W. (2d) 850 (Mo., 1940).*

Pharmacists: Liability for Error in Compounding Prescription.—In an action for damages against the defendant, Marvin Drug Company, the plaintiffs, husband and wife, alleged that Mrs. Smith was a "free bleeder" and was under the treatment of her private physician. As a part of such treatment, her physician gave her a certain prescription which the defendant compounded. The plaintiffs' complaint alleged in the alternative (1) that the defendant contracted to compound the prescription given to it but that it breached such contract by compounding and delivering to the plaintiff some other and different medicine, the use of which resulted in an aggravation of the illness, and damages, or (2) that the defendant negligently failed and refused to compound and fill the prescription but delivered another and different medicine, and that such negligence caused an aggravation of the plaintiff wife's illness. The court of civil appeals of Texas held that the complaint stated a good cause of action and concluded that the trial court erred in dismissing the suit. Accordingly the judgment for the defendant was reversed and the cause remanded for a trial on the merits.—*Smith v. Marvin Drug Co., 150 S. W. (2d) 875 (Texas, 1941).*

Society Proceedings

COMING MEETINGS

- Alabama, Medical Association of the State of, Montgomery, Apr. 21-23. Dr. D. L. Cannon, 519 Dexter Avenue, Montgomery, Secretary.
- American Association for Thoracic Surgery, St. Louis, May 13-16. Dr. Richard H. Meade Jr., 2116 Pine St., Philadelphia, Secretary.
- American Association of Anatomists, New York, April 13. Dr. Elot R. Clark, Dept. of Anatomy, University of Pennsylvania School of Medicine, Philadelphia, Secretary.
- American Association of Industrial Physicians and Surgeons, Cincinnati, Apr. 13-17. Dr. Edward C. Holmblad, 28 East Jackson Blvd., Chicago, Managing Director.
- American Association of Pathologists and Bacteriologists, St. Louis, April 23. Dr. Howard T. Karsner, 2085 Adelbert Rd., Cleveland, Secretary.
- American Association of the History of Medicine, Atlantic City, N. J., May 3-5. Dr. Henry E. Sigerist, 1900 East Monument St., Baltimore, Secretary.
- American Association on Mental Deficiency, Boston, May 13-16. Dr. Neil A. Dayton, 100 Nashua St., Boston, Secretary.
- American College of Physicians, St. Paul, Apr. 20-24. Mr. E. R. Loveland, 4200 Pine St., Philadelphia, Executive Secretary.
- American Federation for Clinical Research, Minneapolis, Apr. 20-21. Dr. Thomas M. Durant, 3401 North Broad St., Philadelphia, Secretary.
- American Pediatric Society, Sky Top, Pa., Apr. 30-May 2. Dr. Hugh McCulloch, 325 North Euclid Ave., St. Louis, Secretary.
- American Physiological Society, Boston, March 30-April 4. Dr. Carl J. Wiggers, 2109 Adelbert Rd., Cleveland, Secretary.
- American Society for Clinical Investigation, Atlantic City, N. J., May 4. Dr. Eugene M. Landis, University of Virginia Hospital, Charlottesville, Va., Secretary.
- American Society for Experimental Pathology, Boston, April 1-3. Dr. Harry P. Smith, Medical Laboratory Bldg., Iowa City, Secretary.
- American Society for Pharmacology and Experimental Therapeutics, Boston, March 31-April 4. Dr. Raymond N. Bieter, University of Minnesota Medical School, Minneapolis, Secretary.
- American Society of Biological Chemists, Boston, Apr. 7. Dr. A. K. Balls, Bureau of Agricultural and Engineering Chemistry, Washington, D. C., Secretary.
- American Surgical Association, New Orleans, Apr. 6-8. Dr. Charles G. Mixer, 319 Longwood Ave., Boston, Secretary.
- Arkansas Medical Society, Hot Springs National Park, Apr. 27-29. Dr. W. R. Brooksher, 602 Garrison Ave., Fort Smith, Secretary.
- Association of American Physicians, Atlantic City, May 5-6. Dr. Hugh J. Morgan, Vanderbilt University Hospital, Nashville, Tenn., Secretary.
- California Medical Association, Del Monte, May 4-7. Dr. George H. Kress, 450 Sutter St., San Francisco, Secretary.
- Federation of American Societies for Experimental Biology, Boston, March 31-April 4. Dr. D. R. Hooker, 19 West Chase St., Baltimore, Secretary.
- Florida Medical Association, Palm Beach, Apr. 13-15. Dr. Shaler Richardson, 111 West Adams St., Jacksonville, Secretary.
- Georgia, Medical Association of, Augusta, Apr. 28-May 1. Dr. E. D. Shanks, 478 Peachtree St. N.E., Atlanta, Secretary.
- Iowa State Medical Society, Des Moines, Apr. 15-17. Dr. Robert L. Parker, 3510 Sixth Ave., Des Moines, Secretary.
- Kansas Medical Society, Wichita, May 11-14. Mr. C. G. Munns, 112 West Sixth St., Topeka, Executive Secretary.
- Louisiana State Medical Society, New Orleans, Apr. 27-29. Dr. P. T. Talbot, 1430 Tulane Ave., New Orleans, Secretary.
- Maryland, Medical and Chirurgical Faculty of, Baltimore, Apr. 28-30. Dr. Richard T. Shackelford, 1211 Cathedral St., Baltimore, Secretary.
- Medical Library Association, New Orleans, May 7-9. Miss Anna C. Holt, 25 Shattuck St., Boston, Secretary.
- Mississippi State Medical Association, Jackson, May 12-14. Dr. T. M. Dye, P. O. Box 295, Clarksdale, Secretary.
- Missouri State Medical Association, Kansas City, Apr. 27-29. Mr. E. H. Bartelsmeyer, 634 North Grand Blvd., St. Louis, Executive Secretary.
- National Tuberculosis Association, Philadelphia, May 6-9. Dr. Charles J. Hatfield, 1790 Broadway, New York, Secretary.
- Nebraska State Medical Association, Omaha, May 4-7. Dr. R. B. Adams, 416 Federal Securities Bldg., Lincoln, Secretary.
- New Hampshire Medical Society, Manchester, May 12-13. Dr. Carleton R. Metcalf, 5 South State St., Concord, Secretary.
- New Jersey, Medical Society of, Atlantic City, Apr. 21-23. Dr. Alfred Stahl, 55 Lincoln Park, Newark, Secretary.
- New York, Medical Society of the State of, New York, Apr. 27-30. Dr. Peter Irving, 292 Madison Ave., New York, Secretary.
- North Carolina, Medical Society of the State of, Charlotte, May 11-13. Dr. Roscoe D. McMillan, P. O. Box 232, Red Springs, Secretary.
- Ohio State Medical Association, Columbus, Apr. 28-30. Mr. C. S. Nelson, 79 East State St., Columbus, Executive Secretary.
- Oklahoma State Medical Association, Tulsa, Apr. 29-May 1. Mr. R. H. Graham, 210 Plaza Court Bldg., Oklahoma City, Executive Secretary.
- Pacific Coast Ophthalmological Society, Portland, Ore., May 11-14. Dr. C. Allen Dickey, 450 Sutter St., San Francisco, Secretary.
- South Dakota State Medical Association, Sioux Falls, May 13-15. Dr. Clarence E. Sherwood, 107 1/2 Egan Avenue South, Madison, Secretary.
- Tennessee State Medical Association, Memphis, Apr. 14-16. Dr. H. H. Stouiders, 706 Church St., Nashville, Secretary.
- Texas State Medical Association of, Houston, May 11-14. Dr. Holman Taylor, 1404 West Fl. Paso St., Fort Worth, Secretary.

CENTRAL SOCIETY FOR CLINICAL
RESEARCH*Fourteenth Annual Meeting, Held in Chicago, Nov. 7 and 8, 1941*The President, DR. LAWRENCE D. THOMPSON,
St. Louis, in the ChairCongenital Malformations on a Nutritional
Basis in Rats

DR. JOSEF WARKANY and ROSE C. NELSON, PH.D., Cincinnati: When female rats are reared and bred on Steenbock and Black's rachitogenic diet number 2956 supplemented with viosterol to forestall the development of rickets, congenital malformations appear in about one third of their offspring. External inspection of the newborn animals reveals some of the congenital malformations, such as shortening of the mandible, protrusion of the tongue and syndactylism of the fingers and toes. The skeletal abnormalities can be studied better after the young are cleared by the Schultze-Dawson method. Then shortening or absence of the tibia, fibula, radius and ulna, shortening of the mandible and fusion of the ribs and of the sternal centers of ossification can be seen in such cleared specimens. Gross abnormalities of the soft tissues can also be observed in a few animals. Microscopic histologic examination of the abnormal skeletal structures reveals delay of ossification, persistence of cartilage in places where ossification should have taken place and abnormalities in the preformed cartilage itself.

The congenital malformations can be prevented by the addition of 2 per cent dried pig liver to the deficient diet of the mother. An alcoholic extract of dried pig liver has been found to be equally protective. The calcium content of the diet also seems to play an important role, since a reduction of the calcium carbonate content of the diet from 3 to 1 per cent results in a significant reduction of the incidence of abnormal offspring.

Abnormal and normal offspring can be obtained alternately from the same female when the deficient diet and the diet supplemented by liver are fed alternately. The experimental results described have been obtained in two different strains of rats. It seems that the normal prenatal bone development of these rats depends on a nutritional factor which is absent or inadequate in the deficient diet and present in large amounts in liver.

DISCUSSION

DR. M. J. SHAPIRO, Minneapolis: Did you investigate the heart in these rats? How did the deficient diet affect the size of litters?

DR. JULIAN E. BENJAMIN, Cincinnati: What was the effect on the female, and did it make any difference in the course of gestation when the diets were changed?

DR. JOSEF WARKANY, Cincinnati: The hearts have not yet been examined. The average litter size on the deficient diet is five and two tenths, while that on the stock diet is six and eight tenths. While rats on the stock diet can be bred at an age of 2½ to 3 months the animals on the deficient diet often cannot be bred before they are 6 months old. In the experiment of alternating diets the mother's diet was changed before the next mating. Whenever the mother was changed from the deficient diet to the diet containing liver, the subsequent litter consisted of entirely normal offspring.

Vitamin B Complex Studies in Dogs

DR. PAUL J. FOUTS, Indianapolis: In dogs fed a low protein diet supplemented with thiamine hydrochloride, nicotinic acid, riboflavin, pyridoxine hydrochloride and either pantothenic acid or purified liver extract a deficiency state developed characterized by loss of appetite, substantial loss of weight, moderate to severe anemia and peptic and cutaneous ulcers. The condition was prevented by an increase of protein in the diet or by the addition of crude liver extract to the low protein diet. It was not cured or prevented by the addition of cystine, choline, para-aminobenzoic acid, inositol or an eluate of clay absorbate of liver extract.

DISCUSSION

DR. C. A. DOAN, Columbus, Ohio: Was there any disturbance of the white cell equilibrium in these dogs?

DR. H. M. SHEAFF, Oak Park, Ill.: Were observations made on the gastric acidity?

DR. PAUL J. FOUTS, Indianapolis: In most of the dogs on a low protein diet there was terminally a high white cell count. That was pretty consistent, and it went up as high as 90,000 in some animals. We did not test the gastric acidity routinely. In a few dogs examined there was a slight decrease in the free acid.

The Influence of Sex Hormones on Natural Resistance

DR. EMMERICH VON HAAM and IRENE ROSENFELD, Columbus, Ohio: Adult male and female mice, after having received varying amounts of chemically pure estrone, progesterone and testosterone, were infected experimentally with a laboratory strain of type I pneumococcus which killed laboratory animals after an average period of twenty-six to thirty-six hours. It was found that the female sex hormone increased the resistance of mice to experimental pneumococcal infection.

In another series of experiments the effect of estrone on the natural and acquired antibodies of castrated and noncastrated rabbits was investigated. Antibody curves showed a definite increase in the specific and nonspecific antibodies in animals receiving large doses of female sex hormone before and during experimental immunization.

DISCUSSION

DR. CARL G. HARFORD, St. Louis: Did you determine how many minimal lethal doses of pneumococci were used in the first experiment?

DR. EMMERICH VON HAAM, Columbus, Ohio: Our bacterial suspension was so standardized that it killed mice within thirty-six hours in a dilution of 1:100,000.

The Therapeutic Use of a Synthetic Estrogen

DR. EDGAR S. GORDON, Madison, Wis.: Since the effectiveness of diethylstilbestrol as an estrogenic substance for clinical use was established, interest in other possible therapeutic agents of the same type has increased. One such preparation is the methyl ether of diethylstilbestrol, which in animal experiments has proved to be a highly effective estrogenic compound with prolonged action. Since the ether linkage is known to be resistant to rupture under physiologic conditions, this material should release its estrogenic potency slowly over a prolonged period of time. This indeed has been found to be the case, since in rats it has been possible to produce continuous estrus for as long as nine months with one injection.

Clinical trial of this compound (to be referred to as RG-20) has given interesting results. The patients studied were all women with menopausal complaints which had appeared either spontaneously or as a result of roentgen or surgical castration. Criteria of effectiveness have consisted of the patient's own report on the progress or regression of symptoms and that on the vaginal smear according to the technic of Papanicolaou. Fifteen cases have been studied in detail over a period of many months and in 10 others the course has been followed by a much shorter time. Of these, in only 2 cases was it necessary to stop the use of RG-20 completely because of nausea and vomiting. In 3 others these symptoms were slightly troublesome but were tolerated during the short time they appeared after each injection because of the extremely favorable results. One instance of sensitivity, presumably to the sesame oil used as a solvent, was encountered. In all other cases results were completely satisfactory, with periods of control of symptoms up to four weeks following a single injection. RG-20 appears to be an excellent estrogenic preparation for use when prolonged, sustained action is desired.

DISCUSSION

DR. E. PERRY McCULLAGH, Cleveland: Sometimes when diethylstilbestrol is used for several weeks menorrhagia occurs and is difficult to control if administration of the drug is continued. With such a long-acting material as RG-20 has menorrhagia been encountered?

DR. CYRIL M. MACBRYDE, St. Louis: Was endometrial biopsy done on the patients to see whether or not excessive changes were taking place in the endometrium?

DR. PAUL STARR, Chicago: What was the course of the nausea during the thirty days of symptomatic control after a single injection of 20 mg.?

DR. E. S. GORDON, Madison, Wis.: The intensity of the estrogenic action and the nausea appeared to be greatest during the first twenty-four to forty-eight hours. If nausea did not appear within the first twenty-four hours, it usually did not appear at all. I have not done endometrial biopsies. The menorrhagia I have seen occurred only in a patient with an enlarged uterus. This occurred with the diethylstilbestrol therapy only and not with the RG-20 therapy. On cessation of therapy all evidence of menorrhagia stopped and the uterus went back to normal size, and later the menopausal symptoms came back. They could not be controlled by administration of estrone or estradiol without the production of further vaginal bleeding. That is the only case in which I have seen excessive bleeding.

Changes in Liver, Blood and Bone Marrow Produced by Estrone, Estradiol and Diethylstilbestrol

DRS. CYRIL M. MACBRYDE, DANTE CASTRODALE and ELSON B. HELWIG and OLGA BIERBAUM, B.S., St. Louis: Clinical studies have resulted in a variance of opinion among different groups of investigators regarding the toxicity of diethylstilbestrol. To clarify this question, large estrogenically equivalent doses of estrone, estradiol and diethylstilbestrol were given to dogs. Changes were produced in the liver, blood and bone marrow by each of these estrogens, and these changes were indistinguishable as to quality and degree. In the peripheral blood there is at first leukocytosis and then thrombocytopenia, followed by hemorrhage and anemia. The bone marrow showed first early myeloid hyperplasia, then decrease or disappearance of megakaryocytes and finally diffuse hypoplasia. The hepatic changes consisted of fatty degeneration and hydropic degeneration. They occurred before the appearance of the hemorrhagic state and presumably were the result of direct action on the liver cells. The doses used were much larger than those employed clinically. No suggestion of similar toxic changes has been found in our clinical studies.

DISCUSSION

DR. EMMERICH VON HAAM, Columbus, Ohio: In our experiments on diethylstilbestrol my associate and I used estrone in control animals. We found that equal doses of estrone did not produce the same hepatic changes in white rats as did diethylstilbestrol. The toxicity of estrone was also observed in our animals, but the toxic dose was far greater than the toxic dose of diethylstilbestrol.

Effect of Androgens on the Blood Count of Men

DRS. E. PERRY McCULLAGH and T. REID JONES, Cleveland: In 10 eunuchoid and 2 normal men given methyl testosterone, testosterone propionate or both the erythrocyte count, hemoglobin content and the hematocrit reading of the circulating blood were studied during periods varying from one month to eight years. In 8 of the 10 eunuchoid and in 1 of the 2 normal men these values rose with therapy, fell on withdrawal of therapy or did both. In 7 of the 9 men who responded to treatment the curve of the blood count was shown to follow approximately the curve of the basal metabolic rate. In 2 of the 7 cases in which this parallelism occurred the shift in the basal metabolic rate was more rapid than that in the blood count, while in 3 the blood count changed as rapidly as the basal metabolic rate; in 2 this relationship could not be determined. It is concluded that the changes in erythrocyte and hemoglobin levels observed with androgen therapy are related to changes in the basal metabolism and perhaps other intimately connected metabolic shifts. We believe we have reproduced a rapid form of the change in the hemopoietic system which occurs slowly in normal persons during adolescence.

DISCUSSION

DR. C. A. DOAN, Columbus, Ohio: Were reticulocyte counts, studies of the blood volume and studies of fluid excretion and intake made for these patients? Were there any alterations in the remaining blood elements?

DR. E. PERRY McCULLAGH, Cleveland: In cases in which the white cell count was done there was no significant shift found to parallel the shift in the red cell count. Reticulocyte counts were done for 1 patient who received methyl testosterone in doses of 500 mg. a day for ten days. The reticulocyte count

was obtained several times before medication and approximately on alternate days throughout medication and subsequently. No reticulocyte response was observed. Studies on the blood volume are being done now. The weight shift has not been correlated with the blood counts on the charts shown, but almost all patients gain weight when receiving injections of testosterone propionate. The standard weight gain with methyl testosterone has not been above 20 pounds (9 Kg.), and most of this is apparently water retention, because the patient loses weight rapidly on cessation of treatment.

The Effect of the Synthetic Dicoumarin 3,3'-Methylenebis (4-Hydroxycoumarin) on the Prothrombin Time and Coagulation Time

DRS. OVID O. MEYER, JAMES B. BINGHAM and FREDERICK J. POHLE, Madison, Wis.: Link and his associates, of the Wisconsin Agricultural Experimental Station, have isolated the causative hemorrhagic agent in spoiled sweet clover disease of cattle. Further, they have recently synthesized this substance, thus making it readily available in considerable quantities for clinical study.

The substance 3,3'-methylenebis (4-hydroxycoumarin) has been administered to dogs and to human beings orally and, in the form of the sodium salt, intravenously. The administration in suitable single doses by either route is followed after a usual latent period of twenty-four hours or more by prolongation in the prothrombin time and the coagulation time, which is sustained over several days, with a gradual return to normal levels. The administration of vitamin K does not inhibit the prothrombin prolongation effect, but transfusions will temporarily restore the prothrombin time and coagulation time to normal.

Pathologic studies have demonstrated widespread dilatation of small vessels but no significant hepatic change. Tests of hepatic function have not been altered by the dicoumarin.

This material has been given in single and repeated doses to a large number of dogs and to patients with a variety of conditions in order to establish an effective but safe dose. We have found that 4 to 5 mg. per kilogram may be given intravenously or orally with safety. This dose may be repeated as necessary, the necessity being determined by the prothrombin time and the coagulation time. An alternate plan has been that of oral administration of daily doses of 1 to 1.5 mg. per kilogram after the initial larger dose. It is conceivable that the material may well have an important place in clinical medicine in the prevention of thrombosis and in other circumstances as a substitute for heparin. It has the advantages over heparin of potency when given orally and of relative inexpensiveness. On the other hand there are hazards from incautious use of this dicoumarin, for gross bleeding might occur if the dose is excessive. The effect of even a single dose is protracted and cannot be quickly neutralized except by transfusions of blood or serum.

The Effect of 3,3'-Methylenebis (4-Hydroxycoumarin) on Blood Coagulation Factors

DRS. NELSON W. BARKER, HUGH R. BUTT, EDGAR V. ALLEN and JESSE L. BOLLMAN, Rochester, Minn.: We have administered 3,3'-methylenebis (4-hydroxycoumarin) orally to 52 human subjects. This series includes 4 normal subjects, 9 patients with peripheral vascular disease associated with arterial thrombosis, 1 with subacute bacterial endocarditis, 10 with postoperative pulmonary embolism and infarction, 7 with postoperative thrombophlebitis and 21 patients with abdominal operations without vascular complications. In the last mentioned group the administration of the drug was begun on the second postoperative day.

Daily determinations of the Quick prothrombin time and the Lee-White coagulation time have been made on these patients before, during and after the administration of the drug. With a few exceptions we have noted a somewhat variable but definite increase in the prothrombin time in all cases. Increase in the coagulation time usually occurred but was considerably less consistent than the effect on the prothrombin time and not entirely parallel to it.

The most effective doses of 3,3'-methylenebis (4-hydroxycoumarin) were 300 mg. the first day and 200 mg. the second day, each given in a single dose. The elevation of the prothrombin time was usually noted on the third day, but if this did not occur

we continued to give 200 mg. daily until the prothrombin time became greater than thirty-five seconds (our normal was nineteen to twenty-two seconds). If it was felt desirable to maintain an elevated prothrombin time, a single dose of 200 mg. was given as soon as the prothrombin time became less than thirty-five seconds, and this was continued daily until the prothrombin time again became greater than thirty-five seconds. Two patients were found to be resistant to the effects of the drug in the doses mentioned.

The experimental work on animals has demonstrated that the chief hazard of the administration of 3,3'-methylenebis (4-hydroxycoumarin) is the likelihood of hemorrhage. We encountered hemorrhage in 6 cases, in all of which operation had been performed and there had not been previous evidence of thrombotic or embolic disease. In 5 the hemorrhage was minimal, and in 1 it was moderate. In all cases the hemorrhage came from operative wounds.

We have noted no other untoward effects of the drug except that in 1 case urticaria and headache developed twice after its administration.

The administration of vitamin K prior to and during the same period that 3,3'-methylenebis (4-hydroxycoumarin) was given has not prevented the elevation of the prothrombin time. After the prothrombin time has been elevated, the effect of vitamin K in restoring it to normal has been variable and somewhat inconsistent. In 6 cases blood transfusions were given when the prothrombin time was elevated. This was followed by a gradual drop in the prothrombin time to normal, usually within one to twelve hours. It was occasionally found necessary to give two or three transfusions of 500 cc. each to secure this effect, and only fresh blood was effective. There was a tendency for the prothrombin time to rise again twenty-four to forty-eight hours after it had been restored to normal by transfusion.

In none of the cases did we observe any clinical evidence of new thrombosis, extension of previously existing thrombosis, pulmonary embolism or infarction when the prothrombin time was elevated as the result of the administration of the drug. This series of cases is too small for one to draw a definite conclusion that the drug will accomplish the effect which we desire, namely the complete prevention of thrombosis and therefore of embolism. The preliminary studies indicate that 3,3'-methylenebis (4-hydroxycoumarin) may be valuable as a substitute for heparin in the treatment of many of the conditions for which heparin is now used. It possesses the obvious advantages that it is inexpensive and can be administered by mouth.

DISCUSSION ON PAPERS OF DRs. MEYER, BINGHAM AND POHLE AND DRs. BARKER, BUTT, ALLEN AND BOLLMAN

DR. ELMER L. DEGOWIN, Iowa City: I should like to ask what effect preserved blood has on the action of dicoumarin.

DR. HOWARD ALT, Chicago: Would Dr. Meyer comment on the possible mode of action of synthetic dicoumarin?

DR. ARMAND J. QUICK, Milwaukee: I should like to point out three differences between the action of heparin and that of this new substance, dicoumarin: 1. Dicoumarin requires twenty-four hours before it begins to inhibit coagulation, whereas heparin is active immediately after injection. 2. When the prothrombin concentration is once reduced by dicoumarin it can be elevated only by a blood transfusion. 3. This new material, as Dr. Meyer said, definitely has a dilating effect on the minute blood vessels, whereas no vasodilatation occurs from the injection of heparin. These three disadvantages of dicoumarin must be considered in its therapeutic evaluation. It is obvious that a simple name for the active principle of toxic sweet clover is desirable. The complete chemical name is complex, and the term dicoumarin is indefinite. I therefore suggest the term melilotoxin, since the scientific name for sweet clover is melilotus.

DR. JESSE L. BOLLMAN, Rochester, Minn.: We have found this dicoumarin compound valuable in the experimental laboratory in experiments involving cannulation of arteries and veins of dogs when delayed coagulation was necessary. We gave the dicoumarin compound four to seven days prior to the experiment. The surgical procedures were not attended by excessive bleeding, and the blood in the cannulas in arteries and veins did not thrombose during six hours of observation. Thrombosis in the cannulas would occur in untreated dogs in a few minutes;

large amounts of heparin were previously necessary for these experiments. Continued use of excessive amounts of the dicoumarin is dangerous. The animals bleed spontaneously and die, since the drug is the active agent of sweet clover disease.

DR. OVID O. MEYER, Madison, Wis.: My associates and I feel that the points Dr. Quick has made are well taken. We who talk about dicoumarin are more anxious that the name be simplified than is he. We do not know the mode of action. Dr. Link feels that this material may undergo a change within the body and that during the time this occurs there is a latent period. I think the possibility that the dicoumarin acts as a physiologic inhibitor of the liver is tenable. During the latent period the prothrombin that existed in the blood is used, and when this has been completely utilized, the liver being inhibited, there is a fall in prothrombin and a prolongation of the prothrombin time. All this is of course purely theoretical. I might say that when large doses have been given by Link and his associates much of the dicoumarin has been recovered in the feces. Regardless of the dose the latent period always is observed and massive doses do not appear to have an appreciable shortening effect. It is true, however, that when the larger dose is given the effect is more protracted. As to Dr. De Gowin's question, only several days ago we gave 250 cc. of banked blood to a patient whose coagulation time was twenty-three minutes. The coagulation time within the hour fell to thirteen minutes, but the prothrombin time was not appreciably affected. Of course the actual quantity of blood was not more than 125 cc. (there being 125 cc. of preservative); so the factor of quantity as well as the factor of storage of the blood must be taken into account in the failure of any appreciable effect on the prothrombin. I do not believe that banked blood is as satisfactory as fresh blood, and Dr. Barker, I believe, has so stated in his paper.

DR. NELSON W. BARKER, Rochester, Minn.: Our experience has been that transfusion of banked blood does not produce the same effect as does transfusion of fresh blood in restoring to normal the prothrombin time of patients who have received 3,3'-methylenebis (4-hydroxycoumarin). The reasons for this are not clear, although it is probable that the prothrombin in the banked blood is destroyed or inactivated after a time. It is probable that the entire effect of the transfusion is in restoring prothrombin. The effect of the transfusion is somewhat more striking if the prothrombin time is falling than if it is rising. The exact basis for the effect of the drug on the prothrombin time is not known, but it is probable that the drug prevents the formation of prothrombin.

Undescribed Type of Erythropoiesis Observed in Human Sternal Marrow

DRs. LOUIS R. LIMARZI, SAMUEL A. LEVINSON and ROBERT M. JONES, Chicago: The observation of previously undescribed erythrocytogenesis in human sternal marrow is the subject of this report. Amitotic and multipolar erythrocytogenesis have been observed in serially aspirated specimens of marrow from a patient dying of acute leukemic reticuloendotheliosis. With this type of erythroid development normal bipolar mitosis also occurred. In normal bone marrow only bipolar mitosis is observed, and even in cases of severe erythroid immaturity this is the only type of cell division noted. In pernicious anemia the rapid conversion of megaloblastic to normoblastic marrow which follows within twenty-four to forty-eight hours the injection of liver extract, multipolar mitoses and large multinucleated erythroid cells are not uncommonly seen. Since the normal bipolar type of mitosis and maturation does not explain this rapid change in the megaloblastic marrow, we believe that the type of erythropoiesis described may explain the change.

DISCUSSION

DR. HARRY AGRESS, St. Louis: I have observed erythropoiesis of the multipolar type in two human embryos and in a number of rat embryos. This phenomenon was not observed in older embryonic life. Dr. Limarzi's observations, together with those noted in the embryos, appear to support the belief that the erythropoiesis in pernicious anemia is of the primitive type rather than a purely functional disturbance.

(To be continued)

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Titles marked with an asterisk (*) are abstracted below.

American Journal of Medical Sciences, Philadelphia 203:1-156 (Jan.) 1942

- Vascular and Cellular Dynamics of Shock. V. H. Moon, Philadelphia.—p. 1.
- *Observations on Etiologic Relationship of Achylia Gastrica to Pernicious Anemia: IX. Difference in Site of Secretion of Intrinsic Factor in Hog and in Human Stomach. H. J. Fox and W. B. Castle, Boston.—p. 18.
- Relationship Between Spleen and Morphologic Picture of Blood Regeneration. W. O. Cruz and Frieda S. Robscheit-Robbins, Rochester, N. Y.—p. 28.
- *The Heart in Sickle Cell Anemia. H. F. Klinefelter, Baltimore.—p. 34.
- Note on Cardiac Murmurs: Recommendation for Revised Terminology. P. D. White, F. D. Adams, Boston, and D. Craib, Johannesburg, South Africa.—p. 52.
- Early Diagnosis of Syphilitic Aortitis. S. Boharas, L. Hollander and M. Goldsmith, Pittsburgh.—p. 54.
- Histologic Kidney Changes in Common Acute Infectious Diseases. M. Kannerstein, Clarksburg, W. Va.—p. 65.
- *Acute Porphyría. S. Nesbitt, New Haven, Conn., and C. H. Watkins, Rochester, Minn.—p. 74.
- Phosphorus Metabolism of Blood of Patients with Leukemia and Polycythemia. L. A. Erf and L. W. Tuttle, Berkeley, Calif.—p. 83.
- May the Disease Complex That Includes Megaesophagus (Cardiospasm), Megacolon and Megareter Be Caused by Chronic Vitamin B₁ Deficiency? E. Etzel, Ann Arbor, Mich.—p. 87.
- Spontaneous Beriberi of Monkey as Compared with Experimental Avitaminosis. C. P. Leblond, Rochester, N. Y., and J. Chaulin-Servinière, Casablanca, French Morocco.—p. 100.
- Vitamin B₁ Not Helpful in Protracted Insulin Shock. Esther Somerfeld-Ziskind, E. Ziskind, L. Dalton and Virginia Buck, Los Angeles.—p. 110.
- Studies of B Vitamins in Human Subject: III. Response of Cheilosis to Vitamin Therapy. T. E. Machella, Philadelphia.—p. 114.
- Postreptal Study of 300 Chronic Alcoholics. J. V. Lowry, Bethesda, Md., and F. G. Ebaugh, Denver.—p. 120.

Achylia Gastrica and Pernicious Anemia.—Using various preparations of hog and human stomachs, Fox and Castle attempted to determine whether the material present in the preparations and possessing a blood forming activity in Addisonian pernicious anemia defined the site at which the intrinsic factor was secreted and whether observations with the hog stomach were applicable to man. The blood forming activity of desiccated preparations of the human stomach, after the arbitrary division (Meulengracht) into pylorus, fundus and cardia, had a distinctly different distribution from that obtaining in similar areas of the hog stomach. The so-called fundus and cardia preparations were definitely effective, whereas the pylorus preparation was, at best, weakly active as compared with ventriculin (New and Nonofficial Remedies). The observations confirm the validity of the experiments of Meulengracht, Ungley and others concerning the effectiveness of desiccated preparations of the pylorus and the ineffectiveness of similar preparations of the fundus portion of the hog stomach. The application of Meulengracht's assumption that the antianemic potency of the pyloric portion of the hog stomach indicates it as the site at which the intrinsic factor is secreted in that animal to the present observations with desiccated preparations of normal human stomach suggests that, in man, areas containing the fundus type of gland, and not the "pyloric gland organ," are the important sites at which the intrinsic factor is secreted. This site coincides with the site of the degenerative process seen in microscopic preparations of the stomach in pernicious anemia. Because the cardia portion of the human stomach is apparently an active site for the secretion of the intrinsic factor, gastric resections in man which preserve this portion should, theoretically, provide a source of intrinsic factor for the patient.

The Heart in Sickle Cell Anemia.—Klinefelter observed that many symptoms present during exacerbations of the disease are similar to those of acute rheumatic fever, and many cardiac signs observed during the quiescent stage resemble those of chronic valvular heart disease, particularly mitral stenosis. Twelve patients, 8 male and 4 female (aged 8 to 27, with the average age 19), with severe sickle cell anemia presented hematocrit values ranging from 20 to 30 per cent. The average duration of the anemia was eleven years. Nine of the 12 patients complained of recurring attacks of pain in the joints of the extremities. The pain sometimes involved the long bones. Several patients have had an inflammatory reaction in a joint with swelling, redness, increased heat and pain on motion. The pain usually occurred during a "crisis," which was frequently preceded by an infection of the respiratory tract. There were associated fever, icterus and leukocytosis. The pain did not respond to treatment with salicylates. None of the patients had so far exhibited frank evidence of congestive heart failure. This seems to occur only during the terminal stage. Seven of the patients have dyspnea on exertion, with or without palpitation, and 5 of these 7 are subject to recurrent ulcers of the leg; 2 other patients without exertional dyspnea have ulcers. The heart of these patients is definitely enlarged. Systolic and diastolic murmurs are common, as are a third heart sound at the apex and an accentuated second pulmonic sound with a systolic murmur at the base. The PR interval is often prolonged. The diagnosis of rheumatic heart disease has often been made in such patients, but it has not been confirmed at necropsy. The cardiac changes in sickle cell anemia are probably secondary to the severe long-standing anemia. The crisis of sickle cell anemia mimics acute rheumatic fever, but it differs in that the pain involves the long bones and is not relieved by the administration of salicylates.

Acute Porphyría.—Nesbitt and Watkins report 3 cases of acute porphyría in which the diagnosis was confirmed by the demonstration of large quantities of uroporphyrin, mostly of the isomeric series III, and 1 case in which despite the usual clinical picture of acute porphyría a diagnosis of paroxysmal hemoglobinuria was made because of spectroscopic demonstration of oxyhemoglobin in the urine and the blood serum during crises. The condition in this case might actually be acute porphyría. The absorption bands believed to be those of oxyhemoglobin were probably the bands of the zinc metal complex of uroporphyrin. The 4 cases were encountered during the last three years, suggesting that the disease is not as unusual as supposed. The disease manifests itself by one or by a combination of the following factors: a familial history, various types of gastrointestinal disturbances, abdominal pain, red or dark reddish brown urine, involvement of the central nervous system, jaundice, renal damage and, rarely, pigmentation of the skin or dermal photosensitivity.

Annals of Internal Medicine, Lancaster, Pa.

15:953-1178 (Dec.) 1941

- Clinical Symptoms and Signs of Vitamin B Complex Deficiency. W. H. Sebrell, Bethesda, Md.—p. 953.
- *Scarlet Fever Immunization. J. A. Toomey, Cleveland.—p. 959.
- Treatment of Acute Empyema: Treatment by Continuous Tidal Irrigation and Suction (Iart). B. Klotz, Washington, D. C., and B. Lidman, Norfolk, Va.—p. 974.
- *Chemotherapy of Bacterial Endocarditis. R. A. Kinsella, St. Louis.—p. 982.
- *Sputum Studies in Pneumonia: Selection of Therapy. A. W. Frisch and A. E. Price, Detroit.—p. 987.
- Medical Aspect of Ankylosing Spondylitis (Marie-Strümpell). W. W. Herrick and T. L. Tyson, New York.—p. 994.
- Rheumatism and Arthritis: Review of American and English Literature for 1940 (Eighth Rheumatism Review). P. S. Hench, Rochester, Minn.; W. Bauer, Boston; E. Boland, Los Angeles; H. Dawson, New York; R. H. Freyberg, Ann Arbor, Mich.; W. P. Holbrook, Tucson, Ariz.; J. A. Key, St. Louis; L. M. Lockie, Buffalo, and C. McEwen, New York.—p. 1002.

Scarlet Fever Immunization.—According to Toomey, since early 1925 immunization to scarlet fever has been offered to all susceptible nurses entering the City Hospital. The Dick test was performed on 4,640 nurses, 3,104 of whom reacted negatively and 1,536 positively. Of the latter 207 were affiliate nurses who did not take contagious disease training and for whom consequently immunization was not compulsory, and of the

remainder 1,329 were actively immunized, 1,273 by inoculation with toxins in doses of 500, 2,000, 8,000, 25,000 and 80,000 units, 41 with Larson's vaccine and 15 with toxin made from stock streptococci. Of the 1,273 nurses 1,181 had negative reactions after one to five or more doses of toxins. Scarlet fever developed in 8 of the successfully immunized nurses; 131 had general reactions (malaise, nausea, headache, high fever, a scarlatiniform rash, vomiting, diarrhea, adenitis and arthritis) some time after the injection. Of 100 nurses tested five years after the first negative Dick reaction had been obtained, approximately 72 per cent still had a negative reaction. It seems that an immunization procedure which protects children 5 to 6 years of age may be sufficient to give them enough immunity so that with the additional stimulus obtained from frequent consequent exposure they may become permanently immunized against the disease. The author suggests that active immunization, though not yet a public health measure, can be used in private practice provided precautions are taken to avoid complications.

Chemotherapy of Bacterial Endocarditis.—Kinsella declares that the diagnosis of bacterial endocarditis must be based on evidence of toxemia, valvular defects, bacteremia and embolic phenomena and that bacteremia from other sources must be excluded. If one reviews the literature with these criteria in mind the number of apparent cures of the disease dwindles. During the last three years 28 patients with acute and subacute bacterial endocarditis have been treated with chemical agents at the University Hospital. Blood cultures were frequently sterilized both by merthiolate and by the sulfonamide drugs. The amount of merthiolate administered should not exceed 0.15 Gm. per hundred pounds (45.5 Kg.) of body weight. It should not be given more frequently than once in ten days, nor should it be used if active hemorrhagic nephritis is present. The sulfonamide derivatives were used in an effort to maintain the usually accepted blood levels of the drug. Two patients were treated with neoarsphenamine. There were no recoveries. The histories of 3 patients are specially mentioned. The first illustrates how standard methods instituted under apparently ideal conditions still failed to bring about a recovery. The second illustrates the possible cure of endarteritis of the pulmonary artery by merthiolate. The third illustrates the cure (observed at necropsy) of bacterial endocarditis or endarteritis by successful ligation of a patent ductus arteriosus. More observation appears necessary to determine which of the procedures (sulfanilamide, sulfapyridine and sulfanilamide therapy combined with physically induced fever and neoarsphenamine therapy), if any, is to be uniformly or occasionally successful.

Sputum Studies in Pneumonia.—Frisch and Price studied Wright stained smears of rusty sputum from patients with pneumococcal pneumonia to determine the severity of the pneumonic process. As an index of the severity the authors relied on the number of extracellular encapsulated pneumococci in the sputum. If the count exceeded 50 per field the prognosis was usually grave regardless of the therapy employed. Examination of the sputum revealed the difference in the therapeutic effects of serotherapy and chemotherapy. Usually within twelve to thirty-six hours after the administration of sulfanilamide, sulfapyridine or sulfathiazole the number of pneumococci in the sputum decreased rapidly. This effect was independent of the agglutination and phagocytosis associated with active or passive immunity. The authors treated 270 patients with proved type I, II, IV, VII and VIII pneumonia. Their sole criteria for the selection of therapy were the number of pneumococci in the sputum and the day of illness on which treatment was begun. Of 48 patients ill more than four days with less than 10 pneumococci per field who received no specific therapy none died. There were no deaths among 70 patients with a relatively mild infection (with 10 or less pneumococci per field) who had been ill three days or less and to whom specific serum was given to prevent the development of more serious pneumonia and to develop an active immunity. The incidence of bacteremia for this group was 17 per cent, and the average dose of serum was only 35,000 units. Chemotherapy was reserved for moderately and severely ill patients (with 11 to 50 pneumococci per field) whose response to treatment with serum was negligible. Of 114 such patients given chemotherapy alone only 7 died. The incidence (40 per cent) of bacteremia and that of multiple lobe

involvement (46 per cent) were significantly higher than in the preceding two groups (0 to 13 per cent and 17 and 17 per cent respectively). The blood stream of 19 of the 24 patients with sputum counts exceeding 50 pneumococci per field harbored bacteria, the total leukocyte counts were low and two or more lobes of 21 were involved. They were given large doses of serum in addition to sodium sulfapyridine and sulfathiazole intravenously. In spite of the intensive treatment the mortality rate was 58 per cent. Of the remaining 14 patients who were variously treated 5 received serum initially, but subsequent specimens of sputum revealed that there were more than 10 pneumococci per field. Serotherapy was discontinued and chemotherapy was begun; 1 of these and 1 of the other 9 patients died. The authors believe that these therapeutic data support the concept that the prognosis can be postulated on the number of pneumococci present in the sputum.

Archives of Neurology and Psychiatry, Chicago

47:1-194 (Jan.) 1942

- Vascular Pattern of Lesions of Multiple Sclerosis. R. S. Dow and G. Berglund, Portland, Ore.—p. 1.
- Hemangioma of Vertebra Associated with Compression of Cord: Response to Radiation Therapy. L. Ferber and I. Lampe, Ann Arbor, Mich.—p. 19.
- Susceptibility to Convulsions in Relation to Age: I. Influence of Acid Fuchsin on Rats of Various Age Groups. A. Fröhlich and I. A. Mirsky, Cincinnati.—p. 30.
- Biochemical Disturbances in Mental Disorders: I. Anti-Insulin Effect of Blood in Cases of Schizophrenia. L. J. Medina, F. J. Gerty and V. G. Urse, Chicago.—p. 38.
- Continuous Ambulatory Insulin Shock Technic in Treatment of Schizophrenia: Report of Two Cases. P. Polatin and H. Spohnitz, New York.—p. 53.
- Cerebral Fat Embolism: Clinicopathologic Study of Two Cases. N. W. Winkelman, Philadelphia.—p. 57.
- Vasospasm and Focal Cerebral Ischemia: Experimental Study. F. A. Echlin, New York.—p. 77.
- Avian Thiamine Deficiency: II. Pathologic Changes in Brain and Cranial Nerves (Especially Vestibular) and Their Relation to Clinical Behavior. R. L. Swank, Boston, and M. Prados, Montreal, Canada.—p. 97.
- Amyloid Neuritis. J. W. Kernohan and H. W. Woltman, Rochester, Minn.—p. 132.
- Section of Cephalic Third of Vagus-Spinal Accessory Complex: Clinical and Histologic Results. I. M. Tarlov, Brooklyn.—p. 141.

Archives of Pathology, Chicago

33:1-144 (Jan.) 1942

- Experimental Studies in Cardiovascular Pathology: IV. Methyl Cellulose Atheromatosis and Thesauriosis. W. C. Hueper, New York.—p. 1.
- Mesonephroma of Ovary: Further Studies. H. W. Jones Jr. and G. E. S. Jones, Baltimore.—p. 18.
- *Oxyuriasis and Appendicitis. J. Schwarz and M. Straub, Rotterdam, Netherlands.—p. 28.
- Heart in Combined Syphilitic Aortic Valvulitis and Rheumatic Heart Disease. J. R. Lisa, C. Solomon and D. Eckstein, New York.—p. 37.
- Toxic Effects of Bitter Tasting Phenylthiocarbamide. C. P. Richter and Kathryn H. Clisby, Baltimore.—p. 46.
- Experimental Atherosclerosis: IV. Effect of Testosterone Propionate and Estradiol Dipropionate on Experimental Atherosclerosis in Rabbits. J. B. Ludden, M. Bruger and I. S. Wright, New York.—p. 58.
- Pulmonary Embolism Caused by Lead Bullet Following Gunshot Wound of Abdomen. R. Straus, Cleveland.—p. 63.
- Pulmonary Embolism Caused by Liver Tissue. R. Straus, Cleveland.—p. 69.

Oxyuriasis and Appendicitis.—Schwarz and Straub examined 36 appendixes to aid in deciding whether Oxyuris vermicularis can cause lesions in the appendix which in turn form ports of entry for microbes. Eight of the appendixes harbored oxyurids, but no inflammation or changes were observed in the mucosa. There were 22 appendixes from patients 25 years of age or less with typical lesions of the mucosa. Often the oxyurids made half moon shaped impressions in the epithelium on which they lay. The epithelium was generally flattened and atrophic and in the deepest places almost endothelium-like. At the edges the cells became long and slender and stained red with acid dye. In the region of the impression a few epithelial cells might be missing, and small erosions and areas of necrosis were seen. Occasionally the oxyurids penetrated into the glands and were found deep in the recesses of the appendicular mucosa. In some instances irregular defects in the glandular epithelium occurred, beneath which hemorrhage and inflammatory exudate were found. Two appendixes had worms encapsulated in their walls. In 4 other specimens nodules were found; 1 contained

part of a worm and 3 contained no recognizable oxyurids, but oxyurids were found in the appendical lumens. Nineteen of the specimens showed ulcerative appendicitis or acute or subacute periappendicitis associated with the presence of oxyurids. Oxyuris may be a primary cause of appendicitis.

Archives of Surgery, Chicago

44:1-186 (Jan.) 1942

- Changes in Brain Volume During Anesthesia: Effects of Anoxia and Hypercapnia. J. C. White, M. Verlot, B. Selverstone and H. K. Beecher, Boston.—p. 1.
- *Local Implantation of Sulfanilamide and Its Derivatives in Wounds: Its Relation to Wound Healing and Peritoneal Adhesions. S. P. Harbison and J. A. Key, St. Louis.—p. 22.
- *Histologic Character of Undescended Testis After Puberty: Its Significance with Reference to Performance of Orchiopexy. C. E. Rea, St. Paul.—p. 27.
- *Postoperative Infections of Respiratory Tract in Relation to Inhalation and Spinal Anesthesia: Study of 631 Cases. J. Lyford 3d, Baltimore.—p. 35.
- *Preoperative and Postoperative Infections of Respiratory Tract in Relation to Inhalation and Spinal Anesthesia. J. Lyford 3d, Baltimore.—p. 41.
- Primary Suture of Common Bile Duct in Cholelithiasis. P. L. Mirizzi, Córdoba, Argentina.—p. 44.
- Prophylactic Intraperitoneal Introduction of Crystalline Sulfanilamide: Experimental Observations. H. Laufman and Catherine E. Wilson, Chicago.—p. 55.
- Large Retroperitoneal Chylous Cyst: Report of Case, with Experiments on Lymphatic Permeability. F. C. Lee, Baltimore.—p. 61.
- Total Gastrectomy: Indications for Operation with Report of Four Cases. C. B. Morton 2d, University, Va.—p. 72.
- Aseptic Necrosis and Bone Drilling. E. Bergmann and A. Krida, New York.—p. 81.
- Inconstant Sympathetic Neural Pathways: Their Relation to Sympathetic Denervation of Upper Extremity. H. D. Kirgis and A. Kuntz, St. Louis.—p. 95.
- *Wash Basin Contamination in Operating Rooms. J. K. Poppe, New Haven, Conn.—p. 103.
- Two Stages of Bowel Distention: Study of Bowel Injury by Distention and Its Effect on Volume and Concentration of Blood. W. D. Gatch and J. S. Battersby, Indianapolis.—p. 108.
- Rib Resection in Treatment of Scoliosis. H. L. Wenger, New York.—p. 119.
- Capillary Permeability and Inflammation in Rabbits with Staphylococcal Septicemia: Experimental Study. R. H. Rigdon, Memphis, Tenn.—p. 129.
- Reduced Temperatures in Surgery: II. Amputations for Peripheral Vascular Disease. L. W. Crossman, W. F. Ruggiero, V. Hurley and F. M. Allen, New York.—p. 139.
- Lymphosarcoma of Rectum. J. A. Tuta and P. A. Rosi, Chicago.—p. 157.
- Cystic Tumor of Tongue: Report of Unusual Case. G. W. Duncan and R. A. Daniel Jr., Nashville, Tenn.—p. 164.
- Combined Surgical and Physiologic Treatment of Cryptorchism: Description of Operative Procedure. R. H. Abrahamson, New York.—p. 170.

Sulfanilamide and Wound Healing.—In determining in rats the tensile strength of wounds of the abdominal wall, stomach and duodenum after the local implantation of sulfanilamide, Harbison and Key observed that there was no consistent difference between the abdominal wounds treated with sulfanilamide and control wounds. Wounds of the stomach ruptured at tensions of 70 to 140 mm., while wounds in the duodenum resisted tensions of 160 to 520 mm. of mercury. In some instances the control wounds were stronger, and in other instances the wounds in which sulfanilamide had been implanted were stronger. There was considerable difference in the strength of the wall of the viscus of the various animals. In 4 animals the normal lower part of the duodenum was tied off, and this could be ruptured by tensions of 400 to 500 mm. of mercury. Eleven day old wounds of control and experimental animals tended to reach this strength. These experiments indicated that the local introduction of sulfanilamide did not appreciably delay the healing or decrease the tensile strength of a wound. In animals in which sulfanilamide had been introduced there was less reaction around the wounds than was present in the wounds of control animals. The introduction of sulfanilamide and its derivatives did not tend to cause peritoneal adhesions.

Undescended Testis After Puberty.—Rea studied the undescended testes from 46 patients between 15 and 73 years of age. The specimens had been removed at necropsy or at operation because of atrophy, pain, suspected tumor, inability to bring the retained testis into the scrotum, large associated hydrocele or hernia. Atrophy, which usually was progressive with age, was observed microscopically, in all the specimens. Spermatogoniums were observed in 17, primary spermatocytes

in 13, secondary spermatocytes in 8 and spermatids in 3. Spermatozoa were not seen. Spermatids were observed in undescended testes from persons in the third, fourth and seventh decade of life. The germinal epithelium in 2 undescended testes near the external inguinal ring from patients in the sixth and seventh decades of life was fairly well preserved. Because patients with bilateral cryptorchism up to 24 years of age have shown spermatozoa in the semen and because a scrotal position is necessary for continued function, the author feels that orchiopexy may be performed on selected patients with undescended gonads as late as the third decade of life. Less than 5 per cent of the patients with cryptorchism had any preserved germinal epithelium. Only if the testis is of good size and is located near the external ring should orchiopexy be considered for older patients with cryptorchism.

Postoperative Infections of Respiratory Tract.—Lyford states that the incidence of infections of the respiratory tract after inhalation and spinal anesthesia for abdominal operations in patients without such infections preoperatively was 5.8 per cent for ether, 4.9 per cent for cyclopropane and 7.5 per cent for spinal anesthesia. The incidence was unaffected by the patient's age or sex, the length of the operative anesthesia, the preoperative complications, the spinal anesthetic agent, the pre-anesthetic medication or the changes in blood pressure during anesthesia.

Preoperative and Postoperative Acute Infection of Respiratory Tract and Anesthesia.—Lyford points out that the incidence of acute infection of the respiratory tract rose if low grade chronic infections of the respiratory tract, not generally considered to contraindicate even elective operations, existed preoperatively. The incidence among 120 patients with such infections was 13.5 per cent for ether, 17.5 per cent for cyclopropane and 39.5 per cent for spinal anesthesia.

Wash Basin Contamination in Operating Rooms.—Poppe studied the bacterial contamination of basins filled with sterile water. Some of these basins remained sterile when exposed to the air of the room for as long as three and a half hours. Of the total number of basins studied the fluid in 56 per cent, or in 76 per cent when an antiseptic solution was not used, showed from 1 to 50 viable organisms per cubic centimeter. This is in decided contrast to the absence of viable bacteria in all the cultured samples from basins containing zephiran (a disinfectant solution). The absence of any bad infections of wounds in the cases studied by Poppe is surprising in view of the high bacterial contamination of the wash basins. However, 46 per cent of the wounds were drained, and this probably eliminated some of the potential infection. In 36 per cent of the cases in which the wound was not drained the basin was contaminated. Apparently the average incision is able to combat a large amount of contamination.

Bulletin of Johns Hopkins Hospital, Baltimore

69:493-592 (Dec.) 1941

- Creatinuria Induced by Methyl Testosterone in Treatment of Dwarfed Boys and Girls. L. Wilkins, W. Fleischmann and J. E. Howard, Baltimore.—p. 493.
- Accuracy of Clinical Measurements of Arterial Blood Pressure, with Note on Auscultatory Gap. C. Ragan and J. Bordley 3d, Baltimore.—p. 504.
- Effects of Intra-Arterial Injection of Acetylcholine and Prostigmine in Normal Man. A. M. Harvey, J. L. Lilienthal Jr. and S. A. Talbot, Baltimore.—p. 529.
- Observations on Nature of Myasthenia Gravis: Phenomena of Facilitation and Depression of Neuromuscular Transmission. A. M. Harvey, J. L. Lilienthal Jr. and S. A. Talbot, Baltimore.—p. 547.
- *Id.: Intra-Arterial Injection of Acetylcholine, Prostigmine and Adrenalin. A. M. Harvey and J. L. Lilienthal Jr., Baltimore.—p. 566.

Nature of Myasthenia Gravis.—Harvey and Lilienthal studied the influence of the intra-arterial injection of varying amounts of acetylcholine and other substances on the course of myasthenia gravis in 8 patients. Injection of prostigmine methylsulfate resulted in an almost immediate increase in the strength of grip and other movements in the extremity treated. When the sphygmomanometer cuffs obstructing the venous return from the arm had been deflated, power returned to the other myasthenic muscles. The increase in power lasted three to five hours. With one exception there were no visible fasciculations in the muscles of the injected extremity or elsewhere in the

body. The injection of acetylcholine produced a severe, brief, burning pain and a prolonged flushing and sweating in the treated extremity. A few seconds after the injection the fingers, the hand and wrist became flexed. The flexion resembled the carpal spasm of tetany. During the ten to fifteen seconds that the contraction persisted the authors were unable to extend the patient's fingers and wrist. There was no observable change in the strength of grip after the involuntary acetylcholine contraction disappeared. The data indicate that the fibers of a myasthenic muscle retain the capacity for vigorous contraction when adequately stimulated, affording indirect evidence that a defect in nervous or neuromuscular conduction rather than a primary muscular disorder is responsible for myasthenia. In 1 patient injection of epinephrine during a period of profound weakness increased the motor power of the injected arm for thirty or more minutes, but there were no visible involuntary movements. This patient, who was unable to make a fist or to approximate the thumb and second finger, easily effected these finger movements after the injection, although his grip remained feeble. The increase in motor power did not approach that seen after treatment with prostigmine methylsulfate. No generalized improvement of the myasthenic symptoms followed the injection. The same patient received 15 mg. of ephedrine sulfate orally six times a day for four days; the moderate increase in general motor power that followed was real. On the fourth day 0.6 mg. of epinephrine was again injected into the brachial artery; there was a moderate but definite increase in motor power in the injected extremity only. There was no apparent augmentation or prolongation of the epinephrine effect by the ephedrine. In all instances the intra-arterial injection of epinephrine produced cooling, blanching and cyanosis of the extremity and caused the radial pulse to disappear. The similarity between the distribution of muscle weakness in myasthenia gravis and that produced by partial curarization suggests that a circulating inhibitor substance may be responsible for the primary neuromuscular defect. The substance may arise from the thymus. Blalock, Mason, Morgan and Riven reported cure of severe myasthenia gravis by removing a cystic tumor from the thymic region. Some definite abnormality of the thymus gland is observed at necropsy in a significant number of patients with myasthenia gravis. Extirpation of the thymus in patients with severe myasthenia gravis may be worthy of trial.

California and Western Medicine, San Francisco

55:279-336 (Dec.) 1941

- Spinal Lesions: Their Early Signs and Importance in Diagnosis. R. B. Raney, Los Angeles.—p. 284.
Low Back Pain: Rationale of Fasciotomy in Its Treatment. K. O. Haldeman and R. Soto-Hall, San Francisco.—p. 287.
Syphilis: Interpretation of Serologic Reactions. G. V. Kulchar, San Francisco.—p. 290.
*Vitamin E and Nervous Diseases. R. W. Harvey and Portia Bell Hume, San Francisco.—p. 293.
Professional Preparedness. R. A. Pfaff, Los Angeles.—p. 295.
Visual Disturbances Following Head Injury. W. T. Grant, Los Angeles.—p. 298.
Asphyxia Neonatorum. G. Bates, San Francisco.—p. 301.
Medical Aid in the Soviet Union Army. C. L. Rubenstein, San Francisco.—p. 304.
Teaching of Dermatology: Its Development in San Francisco. D. W. Montgomery, San Francisco.—p. 305.

Vitamin E and Nervous Diseases.—Harvey and Hume gave alpha-tocopherol for forty to four hundred and eighteen days to patients with neuromuscular disease. Of 16 patients with amyotrophic lateral sclerosis the progress of the disease in 4 was checked after treatment, suggesting but not proving the possibility of arrest. Of 9 patients with progressive muscular atrophy 1 showed slight clinical improvement. Of 20 patients with progressive muscular dystrophy 4 showed slight to moderate clinical improvement, while in none was there any objective evidence of further progress of the disease. Two of 3 patients with congenital amyotonia showed improvement which probably should be attributed to spontaneous recovery. Of 3 patients with dystrophic myotonia and 1 with dermatomyositis none were improved. Two of 18 patients with multiple sclerosis had remissions of six and twelve months. The improvement could not be attributed to the treatment. The most that can be expected from vitamin E therapy is arrest of the disease process.

Connecticut State Medical Journal, Hartford

5:871-948 (Dec.) 1941

- Medicine and the Antitrust Act: Discussion of Government's Suit Against American Medical Association. W. H. Hamilton, New Haven.—p. 873.
*Problem of Gastric Ulcer. S. M. Jordan, Boston.—p. 879.
X-Ray Examination of 8,210 Selectees at Induction Center, Hartford. P. S. Phelps and Helen M. Green, Hartford.—p. 882.
How To Overcome Smoking Habit. E. Kahn and E. F. Gildea, New Haven.—p. 886.
What We Can Learn from Gastroscopy. J. Flexner, New York.—p. 889.
Prospect for Patients with Large Bowel Cancer in Connecticut. A. W. Oughterson, New Haven.—p. 890.
What Happens to the Patient with Carcinoma of Colon and Rectum? W. Mendelsohn, New Haven.—p. 890.
What May Be Accomplished in Treatment of Cancer of Colon and Rectum. A. W. Oughterson, New Haven.—p. 892.
How Treatment of Carcinoma of Colon and Rectum May Be Improved. J. F. Burke, Waterbury.—p. 893.
Mortality in Diabetic Coma. A. Labensky, New London.—p. 898.
Origin of Connecticut State Medical Society. C. Barker, New Haven.—p. 900.

Problem of Gastric Ulcer.—Jordan points out that in the diagnosis of peptic ulcer it is imperative to determine whether there is an actual ulcer present or whether the symptoms are due to another organic or functional disease. The diagnosis of a functional condition (habitual pylorospasm and hyperchlorhydria) as a forerunner of ulcer is valuable because it may aid in preventing ulcer. If an ulcer is present it is necessary to know whether it is in an active or a healed state. All three types of peptic ulcer are amenable to the same medical or surgical regimen. Rest and neutralization affect favorably the causative agents, spasm and hyperchlorhydria. If rest and neutralization are intensive enough before the ulcer penetrates into neighboring structures the peptic ulcer in any location will heal. To be effective, surgical treatment which removes the actual lesion and prevents a recurrence must be carried out so that neither spasm nor hyperchlorhydria causes a recurrence. In gastric ulcer, in contrast with the duodenal and jejunal type, there is an added danger of confusing a benign, a malignant or a potentially malignant lesion. An ulcer of the posterior wall of the stomach, whether of the media or of the prepyloric area, is most difficult to find and to follow, and its healing may be interfered with because of penetration into the pancreas. In the gastric ulcer, subacute perforation and repeated hemorrhage indicate difficult and only temporary healing and should be regarded as conducive to chronic irritation in the stomach, where malignant changes occur so often. The recurrence of a gastric ulcer is a criterion for possible malignant changes in doubtful cases. Other criteria are failure of occult blood, symptoms and roentgen defects to disappear. Sometimes gastric carcinoma supervenes on a gastric ulcer which has healed incompletely or has recurred, and for this reason complete healing of a gastric ulcer should be assured and the most exacting technic be employed to detect incomplete healing.

Hawaii Medical Journal, Honolulu

1:1-72 (Sept.) 1941. Partial Index

- Rheumatic Heart Disease in Hawaii. S. E. Doolittle and I. L. Tilden, Honolulu.—p. 7.
Kahili Flower (Grevillea Banksii) Dermatitis: Preliminary Report. H. L. Arnold Jr., Honolulu.—p. 15.
Lobectomy for Bronchiectasis. R. L. Hill, Honolulu.—p. 20.

1:1-60 (Nov.) 1941

- Extrapleural Thoracoplasty in Treatment of Pulmonary Tuberculosis: Report of Series of 105 Patients. Staff of the Leahi, Home, Honolulu.—p. 7.
*Epidemic Infectious Conjunctivitis. W. J. Holmes, Honolulu.—p. 11.
*Syphilis and Neurosyphilis in Hawaii: Incidence and Results of Treatment in Territorial Hospital for Mental Disorders. R. D. Kepner, Kaneohe, Oahu.—p. 13.
Kidney Injuries. P. S. Irwin, Honolulu.—p. 20.
Mild Abdominal Pain Due to Ovulation. H. E. Bowles, Honolulu.—p. 23.

Epidemic Infectious Conjunctivitis.—Holmes discusses the rapidly spreading type of acute conjunctivitis that raged in Oahu in the summer of 1941. The condition was referred to by the patient and his physician as "pink eye." The extreme contagiousness of the disease suggested that it might be assumed

ing epidemic proportions. Repeated cultures and smears of the conjunctival scrapings and secretions from 50 unselected patients failed to reveal any organism. It was surmised that a virus is the underlying etiologic agent. The swimmer, the worker in the pineapple cannery, the worker at the emery wheel and the patient with a preexisting ocular disease felt that the particular environment was responsible for the disease. In all cases there was the common factor of rubbing the eyes with dirty fingers. The hand to eye and the eye to hand transmission was further suggested by the involvement of the second eye in three fourths of the patients and the frequent occurrence of the conjunctivitis in more than one member of a family. A contributing factor toward the spread of the disease was the recent great increase in the military and naval personnel, who lived and worked in close contact with one another. At the end of June the disease was widespread, and people from all walks of life, irrespective of age, sex and race, were affected. New infections are still encountered, but the peak has been reached. After an incubation period of two to five days the symptoms are lacrimation, burning, redness, some pain, sensitivity to light and foreign body sensation. A moderate degree of blepharospasm was encountered. Multiple subconjunctival hemorrhages appeared on the tarsal portions of the conjunctivas. Preauricular adenopathy was noticed in about 50 per cent of the patients. Ciliary injection and corneal infiltration often accompanied the superficial inflammation. When the corneal lesions developed, vision was correspondingly reduced and patients also complained of seeing halos around lights. When corneal complications were absent the average duration of the disease was two to three weeks, if they were present the irritation remained for four to six weeks or longer. The various therapeutic remedies usually employed for conjunctivitis were more or less ineffectual. Keeping the patient in a dark room proved most beneficial. Cold compresses afforded more relief than hot applications. Bland lotions and ointments were used for symptomatic relief.

Syphilis and Neurosyphilis in Hawaii.—Kepner states that the percentage of patients with syphilis admitted for the first time to the Territorial Hospital for mental diseases has shown a gradual decline since 1923. The incidence of first admissions for syphilis in one form or another was 17.9 per cent. Of the 582 syphilitic patients admitted 438 were men and 144 were women. This sex ratio compares with first admissions from 1923 to 1940 and with the population of the territory. The incidence (8.4 per cent of the total of syphilitic patients admitted) of neurosyphilis in the hospital compares favorably with that in hospitals on the mainland. Patients with meningovascular syphilis were treated with preparations of heavy metals, arsenicals and iodides. If no improvement followed in six months, tryparsamide or fever therapy or both were tried. Patients with meningoencephalitis or dementia paralytica were treated with a combination of tryparsamide and fever therapy in addition to routine chemotherapy. Improvement or pronounced improvement was noticed in 33.7 per cent of patients receiving drugs only, in 47 per cent after treatment by all methods, in 60 per cent after inductodiatheism and chemotherapy and in 69.2 per cent after typhoid shock and chemotherapy. Earlier treatment of these patients, before the damage to the cerebral parenchyma has become irreparable, would probably improve the results. To that end a spinal puncture should be performed on every patient with syphilis at least once in the course of treatment, preferably in the first year of the disease, and another when treatment is concluded. Invasion of the nervous system probably occurs in all patients with early syphilis. The spinal fluid of any patient under treatment for syphilis who displays unusual irritability, mental dulness, loss of weight, forgetfulness, sleepiness, speech defects, insomnia, judgment defects, fatigability, digestive defects, definite visual impairment, occasional headaches or rheumatoid pains should be examined. To reduce the development of neurosyphilis to a minimum it is necessary to treat early syphilis adequately. If in addition, signs and symptoms of neurosyphilis are looked for it will be possible to institute proper therapy early, and thus many useful and productive years may be added to the life of the afflicted person.

Indiana State Medical Assn. Journal, Indianapolis

35:1-58 (Jan) 1942

- Industrial Health C D Selby, Detroit—p 1
Polycystic Disease of Liver W D Inlow and N F Richard, Shelbyville—p 4
Complications of Mastoiditis J R Swan, Indianapolis—p 9
After Treatment of Poliomyelitis R B Acker, South Bend—p 14
Clinical Application of Newer Laboratory Procedures as Pertains to the Man in General Practice J O Ritchey, Indianapolis, A S Giordano, South Bend, W Dodds, Crawfordsville, and G B Wilder, Anderson—p 17
Gaseous Indigestion C O Ritchey, Evansville—p 21
Surgical Lesions of Kidney—Their Differential Diagnosis, with Note on Management E Rupel, Indianapolis—p 23

Journal of Experimental Medicine, New York

74:511-648 (Dec) 1941

- Studies on Reactions Relating to Carbohydrates and Polysaccharides
LXIV Antigenicity of Dextran Produced by *Leuconostoc Mesenteroides* T H Evans, W L Hawkins and H Hibbert, Montreal, Canada—p 511
*Natural History of Human Poliomyelitis. II. Elimination of Virus A B Sabin and R Ward, Cincinnati—p 519
Inactivating Effect of Sulfapyridine on Leukotoxic Action of Benzene M McCarty and W S Tillett, New York—p 531
Quantitative Study of Scarlet Fever Toxin Antitoxin Flocculation Reaction G A Hottle and A M Pappenheimer Jr Philadelphia—p 545
Capacity of Pleuropneumonia-like Microorganisms to Grow on Chorioallantoic Membranes H F Swift, New York—p 557
Determination of Volume of Extracellular Fluid of Body with Radioactive Sodium N L Kalreider, G R Meneely, J R Allen and W F Bale, Rochester, N Y—p 569
Effect of High Protein Diets on Experimental Renal Hypertension H Philipson, L N Katz and S Rodbard Chicago—p 591
*Occurrence of Poliomyelitis Virus in Autopsies, Patients and Contacts J F Kessel, F J Moore, F D Stimpert and R T Fisk, Los Angeles—p 601
Bactericidal Action of Synthetic Detergents Zelma Baker, R W Harrison and B F Miller, with technical assistance of R Wexler, Chicago—p 611
Inhibition by Phospholipids of Action of Synthetic Detergents on Bacteria Zelma Baker, R W Harrison and B F Miller, with technical assistance of R Wexler, Chicago—p 621

Natural History of Human Poliomyelitis.—Sabin and Ward studied the excretion of the virus of infective poliomyelitis from the human body during the first two weeks of the paralytic illness. They also attempted to discover the origin of the eliminated virus. While the virus could be demonstrated with considerable regularity in the stools (especially in children less than 8 years old), it was not obtained from a single nasal (not nasopharyngeal) secretion or oral secretion and saliva or from large amounts of urine. The hypothesis that virus is present in the stools because it has been swallowed with nasal or other secretions of the upper respiratory tract becomes untenable, and as it is present in the walls of the alimentary tract its origin from this site is much more probable. The negative results obtained with nasal secretions may be due to the presence of an inactivating substance and need not necessarily indicate that the virus is absent. However, studies suggest that the virus neither multiplied in the nervous system nor invaded it by way of the nose because, while it was readily demonstrated in the pharyngeal and intestinal tissue, it was not present in the nasal mucosa or in the olfactory bulbs of the patients studied. No support was found for the hypothesis that poliomyelitis virus in the stools originates from swallowed nasal and oral secretions.

Poliomyelitis Virus in Patients and Contacts.—Kessel and his co-workers summarize their attempt to recover the virus of poliomyelitis from the cord, medulla, colonic contents and urine at the necropsy of patients, from the cerebrospinal fluid, nasal washings and stools of living patients and from the stools of contacts. They have recovered poliomyelitis virus from the spinal cords of 50 per cent of monkeys, from the olfactory bulbs of 10 per cent and from tonsil adenoid tissue of 50 per cent; they recovered the virus at necropsy from the colonic contents of 26 per cent of patients and from the stools of 20 per cent of living patients and from the stools of 5 per cent of the contacts examined. The virus was not recovered from the hypophysis, mesenteric lymph node, thymus, Peyer's patch, bile and urine at necropsy or from the cerebrospinal fluid (questionable in 1) or the urine of 134 living patients. The spinal cords, tonsil-adenoid tissue or the colonic contents were positive for the virus in 73 per cent of the necropsies. The virus was isolated from the stools of 22 per cent of patients with paralysis and from the

stools of 19 per cent of patients without paralysis. Of stools from 35 patients less than 16 years of age 40 per cent yielded virus, while 8 per cent of stools from 38 patients older than 15 yielded virus. At necropsy the cords of 71 per cent of 35 patients less than 16 yielded virus, while the percentage for patients of 16 or older was 31. Repeated study of the stools of 5 patients one month after the first positive stool did not disclose the virus. The stool of 1 contact was positive during the second month after first recovery of the virus, but it was negative during the third month.

Journal of Immunology, Baltimore

42:369-536 (Dec.) 1941

- Experimental Investigation of Immunologic Mechanism as Cause of Glomerulonephritis. C. F. Kay, P. F. Lucchesi and R. B. Rutherford, Philadelphia—p. 369.
- Quantitative Studies on Group Specific Substances in Human Blood and Saliva: II. Group Specific Substance A, with Special Reference to Subgroups. A. S. Wiener and I. Kosofsky, New York—p. 381.
- Passage of Antipneumococcus Antibodies into Pleural Exudates in Rabbits—Comparison of Penetration of Pleura by Horse and Rabbit Serum. J. W. Haviland and J. F. A. McManus, Baltimore—p. 395.
- Occurrence of Salmonella Antigens in Dysentery Bacilli. S. Bornstein, Brooklyn, I. Saphra and J. B. Daniels—p. 401.
- Influence of Colloidal Particles on Visible End Point in Antibody Titrations. D. M. Eisler, Lansing, Mich—p. 405.
- Test of Alternation ("Lattice") Hypothesis with Divalent and Trivalent Haptens. S. B. Hooker and W. C. Boyd, Boston—p. 419.
- Studies on Mechanism of Action of Sulfanilamide. V. Dissociation of Phenomena of Growth Stimulation and Sulfanilamide Inhibition of Hemolytic Streptococci. Helen M. Lynch and J. S. Lockwood, Philadelphia—p. 434.
- Immune Response of Mice to Active Virus and to Formalin Inactivated Virus of Eastern Equine Encephalomyelitis. Isabel M. Morgan and P. K. Olitsky, New York—p. 445.
- Descriptive Therapy of Specific Precipitation. Parts I, II and III. A. D. Hershey, St. Louis—p. 455.

Journal of Nat. Cancer Inst., Washington, D. C.

2:201-308 (Dec.) 1941. Partial Index

- Metabolism of Chicken Tumors. D. Burk, H. Sprince, J. M. Spangler, E. A. Kabat, J. Furth and A. Claude—p. 201.
- Quantitative Induction of Tumors in Mice with Ultraviolet Radiation. H. F. Blum, J. S. Kirby Smith and H. G. Grady—p. 259.
- Liver Catalase Activity of Tumor Bearing Rats and Effect of Extirpation of Tumors. J. P. Greenstein, W. V. Jenrette and J. White—p. 283.
- Relative Enzymatic Activity of Certain Mouse Tumors and Normal Control Tissues. J. P. Greenstein, W. V. Jenrette, G. B. Mider and H. B. Andervont—p. 293.
- Note on Transfer of Strain C3H Milk Influence Through Successive Generations of Strain C Mice. H. B. Andervont—p. 307.

Journal of Pharmacology & Exper. Therap., Baltimore

73:363-472 (Dec.) 1941. Partial Index

- Method for Rapid Isolation and Spectrographic Measurement of Cocaine from Brain Tissue. L. A. Straut, R. B. Aird and S. Weiss, San Francisco—p. 363.
- Mode of Action of Sulfonamides. II. Specific Antagonism Between Methionine and Sulfonamides in *Escherichia Coli*. J. S. Harris and H. I. Kohn, Durham, N. C.—p. 383.
- *Use of Clorarsen in Treatment of Syphilis. R. R. Tompsett, W. G. Downs, W. McDermott and B. Webster, New York—p. 412.
- Comparison of Calcium Acetylsalicylate (as Calcamate) with Acetylsalicylic Acid. J. W. Stutzman, O. S. Orth and C. H. Mellish—p. 420.
- Effect of Metazol on Blood Pressure of Man and Dog. R. A. Woodbury, W. F. Hamilton, H. M. Cleckley and P. P. Volpitta, Augusta, Ga.—p. 431.
- Action of Drugs Beneficial in Myasthenia Gravis. I. Effect of Prostigmine and Guanidine on Serum and Muscle Potassium. V. Thompson and A. Tice, Iowa City—p. 455.
- Effects of Mecholyl, Potassium Chloride and Prostigmine on Neuro-muscular Atrophy and Regeneration. H. M. Hines, J. D. Thomson and B. Lazere, Iowa City—p. 463.
- Sulfapyridine (2-Sulfanilamido-pyrazine): Its Antipneumococcal Activity as Compared with That of Sulfapyridine, Sulfathiazole and Sulfadiazine. L. H. Schmidt, J. M. Rueg-egger, Clara L. Sesler and M. Hamburger Jr., Cincinnati—p. 468.

New Drug for Syphilis.—Tompsett and his associates investigated the antisyphilitic properties of 3-amino-4-hydroxyphenyl dichlorarsine hydrochloride, known as clorarsen. The probable toxicity of the drug was determined in mice and rabbits, and no lesions were found in killed animals that could be attributed to the toxic effect of the drug. The clinical material for the study consisted of 171 patients treated over two years; 117 had early and 38 had late latent syphilis; 4 had asymptomatic neurosyphilis and 12 had various syphilitic lesions. The general scheme of treatment was that of the usual

combined bismuth and arsenical treatment except that treatment with clorarsen was generally prolonged to ten or twelve injections. Forty-eight hours after one injection of 0.045 Gm of clorarsen the surface organisms on dark field examination were usually not present in the lesion. Healing of the primary and secondary lesion was prompt and compared favorably with that following treatment with the standard arsenical drugs. The serologic response of 50 patients with early syphilis to clorarsen therapy was followed by means of the Wassermann reaction at the inception of therapy and at the end of each course. In 40 the positive serologic reaction was reversed within less than six months and in 7 within six to twelve months, and the reaction of 3 is still positive after more than six months of therapy. Of the patients with late syphilis who have received more or less continuous therapy, 10 have had serologic reversal within twelve months. Ten others are considered seroresistant in that they have been treated for more than one year without a reversal of the serologic reaction. In 7 of these there has been a definite decrease in the titer of reagin. The spinal fluid of 33 of 34 patients with early syphilis after more than six months of therapy was negative, and that of 1 was a definite group II fluid nine months after treatment had been begun. Only 1 patient had an infectious relapse. Serologic relapse was not encountered. Gastrointestinal, cutaneous and syncopeal reactions occurred in 51 patients. There were no severe immediate reactions.

Journal of Urology, Baltimore

46:1051-1164 (Dec.) 1941

- Conservative Surgery of Hydronephrosis: Analysis of Results Obtained by Various Procedures. V. J. O'Connor, Chicago—p. 1051.
- Surgical and Nonsurgical Management of Renal and Ureteral Calculi. J. H. Sanford and W. T. Barnhart, St. Louis—p. 1061.
- Clinical Study of Two Unusual Types of Renal and Ureteral Disease. C. H. deT. Shivers and J. H. Mathis, Atlantic City, N. J.—p. 1079.
- *Tumor of Suprarenal Medulla Associated with Paroxysmal Hypertension: Report of Case Preoperatively Diagnosed and Cured by Surgical Removal. J. J. Crane, L. A. Aleson and E. L. Touriel, Los Angeles—p. 1100.
- Limitations of Irradiation of Solid Renal Tumors in Children. H. O. Mertz, R. D. Howell and J. W. Hendricks, Indianapolis—p. 1103.
- *Leiomyosarcoma of Prostate: Report of Case and Critical Review. C. L. Prince and S. A. Vest, Charlottesville, Va.—p. 1129.
- Irradiation Control of Testicular Tumor Metastases: Return of Renal Function After Long Apparent Absence. A. Randall, Philadelphia—p. 1144.
- Experimental and Clinical Evidence on Role of 17 Ketosteroids in Prostatic Carcinoma. R. W. Satterthwaite, Justina H. Hill and Elizabeth F. Packard, Baltimore—p. 1149.

Tumor of Adrenal Medulla.—Crane and his co-workers report the cure of a man of 52 who had had paroxysmal hypertension for nine years by the surgical removal of a pheochromocytoma of the right adrenal gland. The tumor was removed through a lumboposterior incision, after it and the normal left adrenal gland had been palpated through a midline abdominal incision.

Leiomyosarcoma of Prostate.—Prince and Vest present the fifteenth case of leiomyosarcoma of the prostate to be cited in the literature and the first, they believe, in which the condition was diagnosed preoperatively. The specimen, which included the entire prostate (which was definitely larger than normal, especially on the right) was removed through a perineal incision according to the technic of Young. The patient, when last seen, one year after the operation, was in excellent health and had no complaints. He had gained weight and was working every day. On rectal examination there was no induration in the region of the bladder or the triangular ligament. Roentgenograms showed no evidence of metastasis. The cause of prostatic leiomyosarcoma is not known, and its relationship to benign leiomyoma of the prostate has not been proved.

Kansas Medical Society Journal, Topeka

42:501-540 (Dec.) 1941

- Pathogenesis of Cholecystitis. N. A. Womack, St. Louis—p. 501.
- Reporting of Tuberculosis in Kansas. F. C. Beelman, Topeka—p. 504.
- Problems in Therapy of Intractable Asthma. A. J. Briar, Topeka—p. 508.
- The Psychiatrist in Relation to the Local Selective Service Board. W. C. Menninger, Topeka—p. 512.
- Epigastric Hernia in a Child. M. A. Walker, Kansas City—p. 515.
- Ascorbic Acid in Treatment of Arsenical Dermatitis. M. Delp, Kansas City—p. 519.

Laryngoscope, St. Louis**51:1073-1142 (Dec.) 1941**

- Abstracts from Literature Relating to Conditions of Trachea and Bronchi. C. J. Imperatori, New York.—p. 1073.
Present Conception of Gradenigo Syndrome. L. M. Hubby, New York.—p. 1085.
Development of Audiometer. C. C. Bunch, St. Louis.—p. 1100.
Pontofacial Angle Tumors, with Particular Reference to Involvement of Acoustic Nerve. J. H. Globus, New York.—p. 1119.

Minnesota Medicine, St. Paul**24:1021-1114 (Dec.) 1941**

- What Should Be Done with Acute Cholecystitis? R. W. McNealy, Chicago.—p. 1035.
Report of State Chairman Committee on Medical Preparedness of American Medical Association. F. L. Smith, Rochester.—p. 1043.
The Doctor in the New Army. J. R. Hall, Washington, D. C.—p. 1045.
Nutrition and National Defense. R. M. Wilder and R. D. Williams, Rochester.—p. 1049.
Physical Defects of Selectees. R. B. Hullsiek, St. Paul.—p. 1052.
Medical Officers of the Future. H. S. Diehl, Minneapolis.—p. 1055.
*Chemotherapy in Treatment of Streptococcal Infections. W. E. Herrell and A. E. Brown, Rochester.—p. 1059.
*Chemotherapy in Acute Otitis Media and Mastoiditis. J. F. Curtin, Minneapolis.—p. 1063.
Our Aging Population. J. F. Norman, Crookston.—p. 1066.

Chemotherapy for Streptococcal Infections.—Herrell and Brown state that the variability of the response of the different strains of streptococci to the sulfonamide derivatives make the selection of the proper drug the most important factor in successful chemotherapy. The dose and the method of administration are next in importance. Sulfanilamide, given orally or subcutaneously, remains the drug of choice for the treatment of infections due to the group A hemolytic streptococcus, and sulfanilamide or azosulfamide for the group B infections. For the average adult with a group C infection 2 or 3 Gm. of a sulfonamide derivative usually will produce adequate urinary concentrations. For infections due to the viridans group of organism either sulfanilamide or sulfapyridine is indicated, provided the organism is not an enterococcus or *Streptococcus fecalis*, against which the thiazole derivatives are effective. The proper compound may be used locally for the management of streptococcal infections as a prophylactic agent against infection or to treat an already existing infection in superficial tissue or in a cavity of the body. Since the isolation of gramicidin, a substance isolated from a soil bacillus by Dubos, much interest has been aroused concerning its use for infections due to the gram-positive organism for which it is a highly effective bacteriostatic agent. Recent observations concerning its hemolytic effect render the substance unsafe for general use. If the hemolytic property of gramicidin can be removed and its bacteriostatic effect preserved, an entirely new approach may ensue in the treatment of streptococcal infections and those associated with other gram-positive pathogenic bacteria.

Acute Otitis Media and Mastoiditis.—Curtin reports on 40 patients with otitis media subjected to chemotherapy and 20 treated without drugs. Of the 40, 19 harbored *Streptococcus hemolyticus* and 5 the pneumococcus, and from 16 no definite organism was recovered. The patients were given large initial doses of sulfanilamide, and the therapy was continued for a week after the temperature, tenderness, leukocytosis, pain and edema subsided. For the group with streptococcal infections three mastoidectomies were performed, for the group with pneumococcal infections one operation and for those showing no organism two operations. In the untreated group the streptococcus was recovered from 9 and the pneumococcus from 3, but no organism was recovered from 8. Five patients had an operation. The figures show a 10 per cent statistical advantage in favor of chemotherapy. There is sufficient evidence to indicate that chemotherapy can shorten the course of the disease and prevent many complications. For streptococcal infections a large initial dose, 1.6 to 2 Gm., of sulfanilamide should be given, followed by 1 Gm. every four hours for three or four days. If the temperature drops and the discharge diminishes, the daily dose can be reduced to 2.6 to 3.2 Gm. for a few days and then to 1.3 Gm. a day for a few days. Chemotherapy should be continued for six or seven days after the symptoms subside to avoid a recurrence. For pneumococcal infections smaller doses of sulfathiazole are given; for acutely ill children the dose is 0.13 Gm. per pound followed by a maintenance dose of 0.065 Gm.

per pound. If the desired results are not obtained the level of the drug in the blood should be checked, as in some patients it does not become optimal with this dose. Antibacterial serum is often a valuable addition to the chemotherapy.

New England Journal of Medicine, Boston**225:929-962 (Dec. 11) 1941**

- The Private Physician's Opportunity in Industrial Medicine. J. J. Bloomfield, Bethesda, Md.—p. 929.
Clinical Classification and Diagnosis of Hemorrhagic Diatheses. W. C. Moloney, Boston.—p. 933.
*Undulant Fever in Massachusetts. R. F. Feemster, Boston, and G. A. Hyder, Lawrence, Mass.—p. 937.
Community Supervision of Mental Defectives in Massachusetts. N. A. Dayton and M. A. Nugent, Boston.—p. 941.
Diabetes Insipidus in One of Twins. H. Blotner, Boston.—p. 946.
Industrial Hygiene. S. S. Pinto and M. Bowditch, Boston.—p. 949.

Undulant Fever in Massachusetts.—Feemster and Hyder state that, since undulant fever was made reportable in 1930, 331 cases have been recorded in Massachusetts through 1940; 14 others were recognized before 1930. Until 1934, no more than 15 cases were recorded in a single year, but since then the yearly report has been 40 or more cases. The principal reason for the increase is that physicians have become more alert in suspecting the disease. In Massachusetts, where the disease is largely due to *Brucella abortus* instead of to *Brucella melitensis* as it is in the Mediterranean countries, there is little tendency toward a seasonal predominance. In Malta persons of the two sexes are about equally affected, but in this country there has always been a predominance among males. In Massachusetts only 85 of the patients were female. Only 6 per cent of all the patients were less than 10 years of age and less than 11 per cent were between 10 and 19; in each decade thereafter the incidence is approximately double. Danger of infection in Massachusetts is not limited to any particular occupation. The disease is most prevalent in rural areas where pasteurization of milk is not the rule. As about 80 per cent of the population of the state lives in communities requiring pasteurization or certification of all milk sold, the incidence of the disease can be expected to be low.

New Jersey Medical Society Journal, Trenton**38:621-686 (Dec.) 1941**

- Technical Approach to Surgical Abdomen. R. S. Gamon, Camden.—p. 626.
*Sulfaguanidine: Absorption, Excretion and Therapy. C. A. Beling, Newark, and A. R. Abel, East Orange.—p. 629.
Unorthodox but Effective Treatment of Scarlatina. L. H. Rogers, Trenton.—p. 634.
Surgical Treatment of Hemorrhoids: New Method. H. E. Bacon, Philadelphia.—p. 636.
What Are Decibels? Painless Analysis. J. J. Roth, Newark.—p. 639.
*Treatment of Septic Thrombophlebitis with Heparin and Sulfathiazole. H. S. Davidson, Atlantic City.—p. 642.
Poliomyelitis in New Jersey. J. L. Mahaffey, Haddonfield.—p. 645.
Malarial Disease Uncovered by Autohemo Fever Therapy After Thirty-Five Years. T. P. Prout and Camella A. Losada, Summit.—p. 647.

Sulfaguanidine.—Beling and Abel determined the absorption and excretion of single and multiple doses of sulfaguanidine by giving 7 apparently normal persons a single dose of 3 Gm. at 8 a. m. and 10 adults 3 Gm. of the drug every eight hours for six to fourteen days. Venous blood was withdrawn after two, four and ten hours and, for four days, at 9 a. m. Examinations of the urine and the stool were made daily on pooled twenty-four hour collections. Excretion of sulfaguanidine in terms of the total ingested dose ranged from 29 to 66 per cent, with the exception of the excretion of 1 subject, which was 96 per cent. The excretion was less when multiple doses were given. Microscopic sections of the kidneys of rabbits given the drug and then killed did not reveal any deposition of crystals or damage to the glomeruli or tubules. Other organs appeared normal. The drug was effective in reducing the number of colon bacilli in the stools if concentrations of the total drug amounted to at least 1,000 mg. per hundred cubic centimeters for six to nine days. Higher concentrations may produce the same results within a shorter time. *Streptococcus fecalis* and the alpha streptococcus were effectively reduced in some cases. The anaerobic bacteria were not always influenced. Although the determination of the blood level is essential to check the absorption and the efficiency of renal excretion, this level was not necessarily correlated with or

indicative of the level in the stool. Three patients with ulcerative colitis were improved by sulfaguanidine therapy and 9 were not improved. Two patients undergoing operation on the colon did extremely well during their postoperative course. This may have been due to the preoperative and postoperative reduction of the number of colon bacilli in the stools. Crystals were found in the urine of all patients. The renal output was not diminished.

Heparin and Sulfathiazole for Septic Thrombophlebitis.—With the thought that giving heparin in septic thrombophlebitis would prevent the further extension of thrombosis, that the existing thrombus would become attached to the wall of the vein and that complicating embolism might not occur, Davidson administered heparin by vein continuously for nine days to a patient with the condition. There was no objection to the use of heparin, as it was not fibrolytic and would not liquefy the existing thrombus but would keep more thrombi from piling up. As the patient's blood on culture was positive for nonhemolytic streptococci, sulfanilamide and then sulfathiazole were given to sterilize the blood stream. No local venous thrombosis was encountered from the injection. Heparin was administered in physiologic solution of sodium chloride. The clotting time was tested at the bedside night and morning, and enough heparin was added to the infusion to keep the clotting time between fifteen and twenty minutes. At no time was there any edema or cardiac decompensation. Two cases are reported by the author which illustrate the prophylactic value of heparin and sulfathiazole in patients in whom peripheral thrombophlebitis is recognized. In his 2 patients fever was present, but blood cultures were sterile. Heparin therapy was instituted to render the blood less coagulable and to prevent the thrombus from extending. Sulfathiazole was given for its bacteriostatic action and to sterilize the blood stream and abolish possible embolic accidents. Both patients recovered.

New York State Journal of Medicine, New York

42:1-96 (Jan. 1) 1942

- Direct Supravaginal Extraperitoneal Cesarean Section. R. J. Pieri and F. R. Irving, Syracuse, N. Y.—p. 25.
 *Plea for Earlier Diagnosis of Rectal Cancer: Analysis of 108 Clinic Patients. R. R. Braund and G. E. Binkley, New York.—p. 33.
 Knott Technic of Ultraviolet Blood Irradiation in Acute Pyogenic Infections: Study of 103 Cases with Clinical Observations on Effects of New Therapeutic Agent. G. Miley, Philadelphia.—p. 38.
 Practical Management of Eczema in Infants and Children. E. D. Osborne, J. W. Jordan and J. J. Hallett, Buffalo.—p. 47.
 Adequate Treatment of Prostatic Disease, with Special Reference to Pathology. R. B. Henline, New York.—p. 51.
 *Observations on Continuous Spinal Anesthesia. G. E. Burford and W. H. Galvin, New York.—p. 54.
 Experience with Sulfapyridine and Sulfathiazole. W. D. Province and F. K. Heath, New York.—p. 59.
 The Ideal Nose. A. A. Cinelli, New York.—p. 64.

Earlier Diagnosis of Rectal Cancer.—Braund and Binkley state that early diagnosis has not kept up with the progress made in the treatment of rectal cancer during the last twenty-five years. The early symptoms of rectal cancer are difficult to record, but an early manifestation of the disease may be any mild symptom that is sufficient to attract the patient's attention to the rectal region. Among 108 unselected patients observed by the authors the first recognizable symptoms were, in order of frequency, blood in the stool, constipation, increase in flatus, diarrhea, pain and mucus in the stool. The 108 patients sought medical advice on an average of eight and nine-tenths months after the onset of symptoms attributable to the rectal cancer. Of 100 patients referred the disease was diagnosed without undue delay in 25. They were referred within one month. For 75 there was an additional average delay of nine and nine-tenths months. During this delay the patients received inadequate or improper therapy. Twenty had not had a rectal examination, and 37 had had a digital examination which would have been sufficient for a tentative diagnosis if it had been performed properly. More than 90 per cent of the rectal cancers were within reach of the examining finger. Forty-six of the 100 referred patients saw two to five physicians before being referred to the clinic. This shopping around is evidence of the patients' dissatisfaction with and failure to improve under the prescribed treatment.

Spinal Anesthesia.—According to Burford and Galvin, the technic described by Lemmon for repeated injections of a small

amount of an anesthetic drug into the subarachnoid space during an operation removes the possibility of an initial large injection proving toxic. The frequent small additions allow gradual detoxification. For the first time the headward diffusion of the anesthetic to the level necessary to produce adequate anesthesia can be approximately controlled. The short acting drug increases the safety of spinal anesthesia with this technic by rapidly losing effectiveness should too high a level of anesthesia become established. For the present, procaine hydrochloride is the drug of choice. Increased safety and reliability are the two major improvements. Theoretical disadvantages relate to the increased possibility of injury to nerve roots, to infection and to meningeal irritation. Minor complications have increased with the technic. The incidence of headache has increased by 10 per cent. The minimum of special equipment is (1) a malleable spinal needle, (2) fine bore, nonkinking rubber tubing and (3) a single Luer-Lok connection adapted to fit the spinal needle on one side and the fine bore tubing on the other.

Northwest Medicine, Seattle

40:435-478 (Dec.) 1941

- Differential Diagnosis and Treatment of Jaundice. H. J. Tumen, Philadelphia.—p. 437.
 Epidemiology of Poliomyelitis: Newer Developments. L. E. Powers, Tacoma, Wash.—p. 446.
 Pathology of Poliomyelitis. C. P. Larson, Tacoma, Wash.—p. 448.
 Neurologic Aspects of Poliomyelitis. R. W. Brown, Fort Steilacoom, Wash.—p. 450.
 Treatment of Poliomyelitis. N. E. Magnussen, Tacoma, Wash.—p. 453.
 Diabetes: Disturbance in Endocrine Regulation of Blood Sugar. S. Soskin, Chicago.—p. 457.
 Stilbestrol in Treatment of the Menopause. C. D. Kimball, Seattle.—p. 464.
 *Zinc Poisoning. T. E. P. Gocher, San Francisco.—p. 467.

Zinc Poisoning.—Gocher enumerates the complaints that follow exposure to the fumes and dust of zinc oxide, chromate, sulfate and chloride. They are dermatitis of the trunk and of the upper parts of the thighs, conjunctivitis, chills, gastrointestinal upsets, chronic anemia after about six months of exposure, boils and eczema. Abdominal influenza may cause an increase in the number of stippled erythrocytes, but this returns to normal as soon as the disease is cured. Abdominal cramps were not encountered if chills were not present. The average blood differential counts of 26 persons exposed to zinc were hemoglobin 85 per cent, leukocytes 8,000, polymorphonuclears 48 per cent, large lymphocytes 32 per cent, small lymphocytes 10 per cent, eosinophils 4 per cent, basophils 0 per cent, large monocytes 4 per cent, erythrocytes normal and about one stippled cell to about 2,000 erythrocytes. The dermatitis was usually a red, papular type that itched severely. It often disappeared spontaneously in two or three months with no recurrence. The rash was often associated with inflammation of the hair follicles. The 26 patients treated and cured were cured more readily if they were no longer in contact with zinc fumes or dust. The best prophylaxis for zinc absorption is good personal and plant hygiene and the use of proper respirators. No permanent disabilities were observed, but a certain number of men retained a distinct susceptibility and allergy to zinc salts.

Ohio State Medical Journal, Columbus

38:1-100 (Jan.) 1942

- Urologic Diagnosis in General Practice. V. C. Laughlin, Cleveland.—p. 17.
 Nutrition in National Defense Program. Martha Koehne, Columbus.—p. 24.
 Clinical and Laboratory Diagnosis of Leptospirosis. Clara Raven, Youngstown.—p. 29.
 Heterophile and Oral Pneumococcal Antigemic Action of Cold Vaccine. H. M. Powell, Indianapolis.—p. 32.
 Treatment of Impetigo Contagiosa. M. T. Elner, Cleveland.—p. 35.
 Mattress and Pillow Coverings. H. Iker, Chicago.—p. 37.
 What Shall We Do for the Pregnant Woman with Syphilis? L. J. Roth, Columbus.—p. 39.
 Diagnostic Hints in Endocrinology. E. Podolsky, Brooklyn, N. Y.—p. 42.
 Stilbestrol Therapy. E. E. Beard, Cleveland, and P. L. Rossmann, Fort Wayne, Ind.—p. 43.
 Consideration of Diseases of Blood Vessels in Diabetes Mellitus. M. H. Rosenblum, Steubenville.—p. 46.
 Pharmacies, Apothekes and Chemist Shops. H. Ditttrick, Cleveland.—p. 50.
 Unexpected Death in Young Individual with Cardiovascular Syphilis: Case Record Presenting Clinical Problems. S. Koletsky, Cleveland.—p. 54.

Pennsylvania Medical Journal, Harrisburg

45:193-320 (Dec.) 1941

- Problems of Aging. E. J. Stieglitz, Bethesda, Md.—p. 211.
- *Indications for Tonsillectomy. G. M. Coates and W. Gordon, Philadelphia.—p. 218.
- Evaluation of Cryotherapy in Treatment of Post Acne Scars. L. Hollander, Pittsburgh, and J. M. Shelton, Washington.—p. 226.
- *Endocrine Manifestations in Diabetic Patients. J. A. Daugherty, Harrisburg.—p. 229.
- Use of Silver Picrate in Sinus Infections: Report of 200 Cases. L. Felderman, Philadelphia.—p. 232.
- Experience with Vinethene as Obstetric Anesthetic. W. F. Hartman, Lancaster.—p. 236.
- Relationship Between Blood Cholesterol, Sugar Tolerance and Basal Metabolic Rate in Thyroid Disease. K. Y. Yarduman and N. M. Wall, Pittsburgh.—p. 239.

Indications for Tonsillectomy.—Coates and Gordon discuss the indications for tonsillectomy as determined by the conditions within, adjacent to and remote from the tonsils. The conditions within the tonsils to be considered when tonsillectomy is contemplated are repeated attacks of tonsillitis, abscesses, Vincent's infection, epidemic streptococcal sore throat and tuberculous, diphtheritic and hypertrophied tonsils. Simple inspection of the fauces and tonsils will often fail to reveal all the foregoing manifestations, and laboratory studies must be resorted to. Children who are allergic or who give a family history of allergy should never be operated on during the hay fever season lest bronchial allergy and/or nasal allergy be precipitated. Conditions adjacent to the tonsils that may require tonsillectomy are acute catarrhal and chronic suppurative otitis media, deafness of the middle ear, labyrinthitis and deafness of the inner ear, sinusitis, thyroid disease, laryngitis, pharyngitis, cervical adenitis, peritonsillar abscess, and ocular disease. The authors do not suggest that tonsillectomy will cure these diseases but advise the operation only when tonsillar sepsis can be proved. Some of the acute and chronic conditions remote from the tonsil that may be traceable to infected tonsils are endocarditis, peritonitis, pleuritis, pericarditis, arthritis, optic neuritis, thyroiditis, herpes zoster, chorea, myositis, bronchopneumonia, appendicitis, enteritis, conjunctivitis, nephritis, pyelitis, neuritis and osteomyelitis.

Endocrine Manifestations in Diabetic Patients.—Studying the histories of 425 diabetic patients Daugherty found that 64 showed evidence of endocrine dysfunction other than dysfunction of the pancreas. The ages of the 64 ranged from 2 to 72 years. The disturbances were attributable to the gonads, the thyroid and the pituitary, and 9 patients had hepatic disturbances which may have been of endocrine origin. A typical case of each endocrine disturbance is presented to show its relation to the diabetic state. Only 1 patient had hyperfunction of the pituitary body, and the diabetes of this patient was severe. In the 3 with hypofunction of the pituitary body the diabetes was also severe. In 12 patients with hyperthyroidism the severity of the diabetes was increased and difficult to control. Severe diabetes seemed to be the rule also in the 10 with hypothyroidism; thyroid extract aided in controlling the diabetes. There were gonadal disturbances in 38 females which definitely affected the course of the diabetes. Hypofunction seemed to aggravate the diabetic state.

Proc. of Staff Meet. of Mayo Clinic, Rochester, Minn.

16:801-816 (Dec. 17) 1942

- Some Effects of Hyperventilation, with Special Reference to Aviation Medicine. R. F. Rushmer, W. M. Boothby and H. C. Hinshaw.—p. 801.
- *Palindromic Rheumatism: "New," Oft-Recurring Disease of Joints (Arthritis, Periarthritis, Para-Arthritis) Apparently Producing No Articular Residues: Report of Thirty-Four Cases. (Its Relationship to "Angioneural Arthritis," "Allergic Rheumatism" and Rheumatoid Arthritis). P. S. Hench and E. F. Rosenberg.—p. 808.

Palindromic Rheumatism.—Hench and Rosenberg describe a new entity, an arthritic recurring disease of joints and adjacent tissue characterized by multiple afebrile attacks of acute arthritis and periarthritis, sometimes also para-arthritis, with pain, swelling, redness and disability. Generally only one small or large joint is affected. The attacks appear suddenly, last for a few hours to one to three days and disappear completely, only to recur at short or long irregular intervals. Despite the transitory presence of an acute or subacute inflammatory polymorphonuclear exudate in the articular tissue and cavity there is little or no constitutional reaction or abnormality in labora-

tory tests, and no significant functional, pathologic or roentgen residues occur even after the disease has been present for years. Of the authors' 34 patients 19 were female and 15 male between 13 and 68 years of age; 70 per cent were between 20 and 39. The disease before admission had lasted from one year to twenty-five years. The frequency of attacks varied from two to ten a year to almost daily attacks in a few patients. In 90 per cent of the patients an attack was usually monoarticular. Generally there was a relative lymphocytosis (the lymphocytes numbering 37 to 48 per cent) during or between attacks. Laboratory tests generally gave normal results, except that blood fats and total lipids were moderately elevated, suggesting some metabolic disturbance. Features favoring an allergic and an infectious origin of the disorder were present. A follow-up study of 27 patients reveals that the various types of treatment tried were ineffective. A cure which may have been spontaneous has occurred in 4, 12 have improved slightly in that their attacks are shorter or occur less often, the disease remains unchanged in 7, and 3 patients are somewhat worse in that they have attacks more often; 1 patient died of coronary disease.

Public Health Reports, Washington, D. C.

56:2365-2404 (Dec. 12) 1941

- Child Health and Selective Service Physical Standards. A. Cioceo, H. Klein and Carroll E. Palmer.—p. 2365.
- Industrial Injuries Among Urban Population as Recorded in National Health Survey. Joan Klebba.—p. 2375.

56:2405-2444 (Dec. 19) 1941

- Quantitative Studies of Tuberculin Reaction: II. Efficiency of Quantitative Patch Test in Detecting Reactors to Low Doses of Tuberculin. M. L. Furcolow and E. L. Robinson.—p. 2405.
- *Studies of Acute Diarrheal Diseases: V. Outbreak Due to Salmonella Typhi Murium. W. E. Mosher Jr., S. M. Wheeler, H. L. Chant and A. V. Hardy.—p. 2415.
- Relapsing Fever: Ornithodoros Parkeri a Vector in California. G. E. Davis, H. L. Wynns and M. Dorothy Beck.—p. 2426.
- Disabling Morbidity Among Industrial Workers, Third Quarter of 1941. W. M. Gafafer.—p. 2428.

56:2445-2484 (Dec. 26) 1941

- Studies of Sewage Purification: XV. Effective Bacteria in Purification by Trickling Filters. C. T. Butterfield and Elsie Wattie.—p. 2445.
- Ornithodoros Parkeri and Relapsing Fever Spirochetes in Utah. G. E. Davis.—p. 2464.

57:1-32 (Jan. 2) 1942

- Indians and Selective Service. J. R. McGibony.—p. 1.
- Coding and Tabulation of Medical and Research Data for Statistical Analysis. T. I. Edwards.—p. 7.

Acute Diarrheal Diseases.—Mosher and his colleagues discuss the occurrence of Salmonella typhi murium dysentery in 237 mentally defective persons and a matron. With the exception of that of the matron the infection was limited to inmates of twelve cottages served by a common kitchen. The diagnosis of the disease in 86 was established by the isolation of the organism; 2 passive carriers were discovered. In contrast to the Salmonella infection, which was acute, Shigella dysenteriae (Flexner and Sonne) was isolated frequently from persons with no evidence of previous symptoms. The Shigella infection in this institution, with the exception of one small outbreak, had previously spread slowly through the cottages and successfully maintained itself for several months. The available evidence indicates that the Salmonella infection was spread during Thanksgiving dinner through turkey or its dressing. This opinion was further supported by the fact that 3 inmates ate in the suspected dining room only on Thanksgiving Day and that the matron sampled the inmates' food. Repeated examination of 195 patients showed that 1 patient carried the organism for eighteen weeks. The primary source of infection may have been a carrier or a patient, contamination of food by rats or mice or a S. typhi murium infection contracted by the turkeys before they were killed. The human element does not seem probable. Cultural studies on rats trapped near the service building were negative, but they do not entirely exclude rodent contamination of the ingredients of the turkey dressing, especially the bread crumbs. However, the general cleanliness and order in the kitchen tend to obviate this probability. The original flock from which the probably incriminated batch of turkeys came could not be determined. The thermal death point for S. typhi murium is thirty minutes at 60 C. Nevertheless, in this outbreak the

organism apparently survived such a temperature. Turkey dressing is a good insulator against heat, and organisms deep in this dressing may have been stimulated rather than inhibited in their growth by the temperature of the oven. The second likelihood is that a septic infection with *Salmonella* was lodged in the deep tissues (marrow) of the turkeys and was comparatively inaccessible to heat.

Radiology, Syracuse, N. Y.

37:659-788 (Dec.) 1941

- Nasal Sinusitis G. W. Grier, Pittsburgh.—p. 659
- *High Voltage Roentgen Irradiation of Accessible Cancer of Skin and Mucous Membrane. G. P. Sims, Columbus, Ohio.—p. 666.
- Physical and Biologic Considerations in Use of Slow Neutrons for Cancer Therapy. P. A. Zahl and F. S. Cooper, New York.—p. 673.
- *Tracer Studies with Radioactive Phosphorus in Malignant Neoplastic Disease. J. M. Kenney, L. D. Marinelli and Helen Q. Woodard, New York.—p. 683.
- Absorption of Radiophosphorus in Irradiated and Nonirradiated Mice. L. D. Marinelli and J. M. Kenney, New York.—p. 691
- Elimination of Radioactive Elements by Patients and Rabbits After Injection of Thorotrast. W. Stenstrom, Minneapolis.—p. 698
- Further Studies on Effects of Irradiation on Proliferation and Metabolic Processes of Normal and Malignant Mammalian Tissues. V. Effects Produced by Different Dosage Rates of X-Radiation on Growth Factors of Mouse Sarcoma 180 Grown in Vivo Following Irradiation in Vitro Anna Goldfeder, New York.—p. 705.
- Depth Dosage Measurements by Means of Goldfish I. Ellinger and R. Gross, New York.—p. 717
- Biologic Effect of Roentgen Rays of Long and Short Wavelength on Totally Irradiated Rat. J. C. Potter, Rochester, N. Y.—p. 724.
- Some Important Considerations of Soft Tissue Anatomy as Revealed by Radiography of Anatomic Cross Sections J. R. Carty, New York.—p. 726.
- Rectal Dyschezia Misnomer for Megarectum P. J. Delano, I. J. Ronayne and T. B. Boland, Chicago.—p. 730.
- Paucalasternal Diaphragmatic Hernia Report of Case on Right Side. R. A. Colmers, New York.—p. 733
- Portable Dark Room for Processing X-Ray Films Rapidly. C. Jones, Santa Barbara, Calif.—p. 740
- Study of Secondary Screening. G. Schönander, Stockholm, Sweden.—p. 743.

High Voltage Irradiation of Accessible Cancer.—Sims has obtained better results in treating many advanced malignant cutaneous lesions with high voltage roentgen therapy (200 kilovolts with medium filtration) than with low voltage therapy. Recurrences have been less frequent, the reaction to irradiation has not been so great, the tumor has regressed more rapidly and primary healing has occurred with less scarring. The total dose should depend on the response of the neoplasm and the reaction of the adjacent normal tissue. Fractionated treatment permits one to evaluate the dose better and to prevent undesirable reactions. So far no perceptible ill effects in the deeper structures have been encountered. The author does not believe that there is any selective action in different types of tissue with different qualities of radiation but believes that the quality produced by 200 kilovolts with heavier filtration gives a more homogeneous and more effective depth dose. The difference between the lethal dose for tumorous tissue and that for normal surrounding tissue appears to be greater with roentgen rays of shorter wavelength.

Radioactive Phosphorus in Neoplastic Disease.—To determine whether the isotope of radioactive phosphorus would be of value in the treatment of certain malignant neoplasms, Kenney and his associates administered about 0.5 microcurie of this isotope in the form of a 1.5 to 3 per cent solution at varying times before operation to patients with carcinoma of the breast, osteogenic sarcoma and lymphosarcoma. Measurement of the radioactivity of portions of the different tissues removed at operation suggests that radioactive phosphorus may be a useful therapeutic agent in lymphosarcoma and a valuable therapeutic adjunct in the treatment of osteogenic sarcoma and mammary carcinoma. As radioactive phosphorus is administered orally or parenterally and is distributed throughout the body it produces in fact a systemic irradiation. Its localization in tissue, as far as is known, is purely a metabolic phenomenon and is dictated by the metabolic need of tissue for phosphorus. Hence its effectiveness depends on its distribution in the body. If it should prove more effective than conventional radiation therapy, it will be so because of this, and especially so if there is a favorable differential absorption by scattered tumor cells.

Review of Gastroenterology, New York

8:421-506 (Nov.-Dec.) 1941

- Some Aspects of Medical Treatment of Peptic Ulcer. T. D. Adams, Boston.—p. 421.
- Surgical Aspects and Treatment of Peptic Ulcer. A. W. Allen, Boston.—p. 426.
- *Nature of Functional Dyspepsia F. J. Gregg and R. R. Snowden, Pittsburgh.—p. 432.
- Diverticulosis: Analysis of Eighty Six Cases. A. Levitt and K. Goldstein, Buffalo.—p. 439
- Gastrogenic Diarrhea. A. Bernstein, Chicago.—p. 447.
- Comfortable Application of Nasogastric Tube. I. L. Barton, Boston.—p. 449.
- *Cancer of Stomach in Children and Young Adults. H. I. Goldstein, Camden, N. J.—p. 450
- Cholesterol Ester Sol as Therapeutic Agent. E. L. Bortz and H. N. G. Kline, Philadelphia.—p. 458
- III Studies of Liver Function of Normal and Diseased Livers from Bile Salt Concentration in Surgical Drainage Bile L. M. Morrison and W. A. Swalm, Philadelphia.—p. 464
- Varied Clinical Aspects of Vitamin K Deficiency H. A. Rafsky, New York.—p. 472.
- Clinical Experience in Treatment of Acute Cholecystitis: Analysis of 100 Cases. H. Frankel, E. Abramson and J. E. Berk, Philadelphia.—p. 481.

Nature of Functional Dyspepsia.—Gregg and Snowden point out that an analysis of the records of 5,000 consecutive patients studied in the Pittsburgh Diagnostic Clinic shows that the complaints of 2,189 were referable to the gastrointestinal tract and warranted complete diagnostic studies. For 1,039, or 47 per cent of the 2,189, a diagnosis of functional dyspepsia was made. A study of the symptoms, physical signs and laboratory evidence presented by the patients with functional dyspepsia, as compared with the same factors in those in whom organic disease was present, shows that there is no characteristic group of symptoms or physical signs and that the ultimate diagnosis of a digestive disturbance should be based on a complete study not only of the intestinal tract but of the gallbladder.

Gastric Cancer.—Goldstein states that a review of the available medical literature of the world for the last hundred years reveals that there have been recorded approximately 350 cases of malignant growths of the gastrointestinal tract in infants, children and young (less than 26 years of age) adults

Rocky Mountain Medical Journal, Denver

39:1-80 (Jan.) 1942

- Medical Problems of Today. F. H. Lahey, Boston.—p. 19.
- Use of Prostagline-Morphine in Obstetrics D. Slaughter, J. M. Siever and R. E. Martinak, Dallas, Texas.—p. 24
- Dysmenorrhea R. J. Crossen, St. Louis.—p. 28.
- Gastrointestinal Diagnosis F. J. Hodges, Ann Arbor, Mich.—p. 33
- Use of Posture to Secure Unilateral Intensification of Spinal Anesthesia. R. P. Middleton and A. W. Middleton, Salt Lake City.—p. 36
- Aniseikonia. V. H. Brobeck, Colorado Springs, Colo.—p. 38
- Manifestations and Management of Asthma. W. C. Service, Colorado Springs, Colo.—p. 41.

South Carolina Medical Assn. Journal, Florence

37:317-350 (Dec.) 1941

- Sprue. H. Smith, Greenville.—p. 317.
- *Tick Paralysis in South Carolina M. W. Beach and B. O. Ravenel, Charleston.—p. 323
- Recognition and Treatment of Common Painful Back Disorders W. R. Mead, Florence.—p. 325.

Tick Paralysis.—Beach and Ravenel report an instance of tick paralysis caused by *Dermacentor variabilis*. A child of 4 became sick the morning prior to admission to the hospital and had weakness, general malaise, difficulty in arising and a staggering gait. These complaints ceased after an hour, and the child played the rest of the day. On the morning of admission the patient had headache and weakness of the lower extremities on walking. The child was hospitalized. Her condition remained about the same until the second day. While combing the patient's hair a nurse discovered a partially engorged tick. The tick was identified as a female *Dermacentor variabilis*. Further search did not reveal more ticks. The child's symptoms cleared rapidly, and on discharge twelve days later there was no muscular weakness and only a slight ataxia. The patient was seen two weeks later, and she appeared completely recovered.

FOREIGN

An asterisk (*) before a title indicates that the article is abstracted below. Single case reports and trials of new drugs are usually omitted.

British Medical Journal, London

2:717-758 (Nov. 22) 1941

*Combined Active and Passive Immunization Against Diphtheria: I. Studies of Antitoxin Response in Normal Students. A. W. Downie, A. T. Glenny, H. J. Parish, W. Smith and G. S. Wilson.—p. 717.
Pneumococcic Peritonitis: Four Cases. C. Noon.—p. 724.

Cutaneous Anthrax Treated by Arsenicals and Sulfapyridine. I. M. Davidson.—p. 725.

Dark Adaptation and Miners' Nystagmus. I. Campbell.—p. 726.

Active and Passive Immunization Against Diphtheria.

—Downie and his collaborators attempted to select a dose of toxoid small enough to reveal any inhibitory action of the serum, a dose of serum that would not conceal the active formation of antitoxin in the body following the injection of toxoid and a toxoid that would not interfere with the action of serum. Studies were carried out on third year medical students aged between 20 and 22 and on some boys, all but 2 of whom were between 14 and 19, at a training colony. The subjects were Schick tested. From 6 to 8 cc. of blood was withdrawn from those giving a positive reaction, and the blood was titrated for diphtheria antitoxin. The subjects giving positive reactions were divided into A and A + P groups. The 148 subjects in group A (active immunization) received 0.1 cc. (5 Lf) of alum precipitated toxoid, and the 131 in group A + P (active plus passive immunization) received 0.1 cc. of alum precipitated toxoid and 350 to 500 units of refined diphtheria antitoxin. All injections were subcutaneous. Four weeks later blood was withdrawn and the subjects were given 0.3 cc. of alum precipitated toxoid. Eight weeks after the second dose, blood was withdrawn, the subjects were Schick tested and those having a positive reaction were given 0.3 cc. of alum precipitated toxoid. The results show that the simultaneous administration of antitoxic serum and alum precipitated toxoid delays and slightly inhibits the formation of fresh antitoxin. With a few exceptions the average antitoxin content of the serum of the A + P group fell from about $\frac{1}{500}$ unit one week to between $\frac{1}{5000}$ and $\frac{1}{10000}$ unit per cubic centimeter of blood four weeks after the first injection. The Schick conversion rate eight to twelve weeks after the second dose of alum precipitated toxoid was 95.7 per cent for the A and 90.5 per cent for the A + P group. The dose of alum precipitated toxoid was so small that most of it was neutralized by the simultaneously injected serum. Therefore a larger dose of alum precipitated toxoid given at the first injection to A + P subjects might cause a higher degree of sensitization and decrease or abolish the difference in the rate and the amount of antitoxin produced by A and A + P subjects. If the same sort of intermediate stage of relative susceptibility between the disappearance of passive and the development of active immunity appears in man as has been observed in guinea pigs, the injection of serum with the first dose of alum precipitated toxoid may not have any advantage over ordinary active immunization.

Lancet, London

2:625-656 (Nov. 22) 1941

Common Sulfonamides: Nomenclature, Structure and Uses. D. G. Ardley.—p. 625.

Active Immunization Against Tetanus. D. G. Evans.—p. 628.

*Placental Blood in Treatment of Amenorrhea. J. Halbrecht.—p. 630.

*Meningococcic Infection. R. C. Dickson, D. Magner, N. E. McKinnon and N. B. McGillivray.—p. 631.

Paradoxical Cerebral Embolism with Recovery. A. G. Porter.—p. 634.

Isoagglutinin Changes After Transfusion of Incompatible Blood and Serum. P. L. Mollison and I. Maureen Young.—p. 635.

Stab Wounds of Heart and Pericardium: Four Cases with Three Recoveries. T. Schrire.—p. 638.

Placental Blood in Treatment of Amenorrhea.—Halbrecht studied the effect of the injection of the plasma of placental blood in 34 women with amenorrhea and sterility. Eighteen of them menstruated within five to thirty-five days after the end of a course of treatment. Three other patients menstruated

on or after the thirty-fifth day. The effect of the plasma of placental blood on the uterine mucosa of 11 women was determined by microscopic examination before and after treatment, which consisted of five or six injections of 150 to 200 cc. of the plasma. Treatment was ambulatory, and the interval between injections was usually one day. The endometrium before treatment was more or less atrophic. After three injections 5 patients showed a complete change from atrophy to the proliferative or secretory state. All 5 menstruated shortly after treatment, although they had been amenorrheic for five months to two years. Another patient menstruated twenty days after the beginning of treatment, but the mucosa remained atrophic. The endometrium of the other 5 patients did not react. The one remaining ovary of 1 of these women had been removed a year before. This suggests that the action of placental blood depends not on its content of estrogenic substance but on the gonadotropic substances present in it. The 5 unresponsive women had not menstruated for two to fifteen years and had an early climacterium. In the women who menstruated or showed changes in the endometrium the size of the uterine cavity increased from 1 to 2.5 cm. Follow-up study of 13 of the 18 women who menstruated after treatment revealed that 5 did so only once and 8 two or more times.

Meningococcic Infection.—Dickson and his co-workers observed 26 patients with meningococcic infection between July 1940 and July 1941. Of these 11 did not have meningitis on admission (though it subsequently developed in 1) but had meningitis septicemia. The infection was sporadic, occurring in every month of the year, and came from Canadian troops stationed in England. Nine of the 11 patients without meningitis were treated with sulfapyridine during the ameningitic phase; 8 recovered completely after 34 Gm. of the drug had been administered in seven days; 12 Gm. was given in the first twenty-four hours. For 1 patient the diagnosis was not made and treatment was not instituted until the disease had been present for three months. The infection was cured by chemotherapy, but there was residual articular pain. The remaining 2 men were not given sulfapyridine until meningitis developed. In 1 case the diagnosis was missed because several blood samples did not show any growth. Such evidence is evidently inadequate to exclude the diagnosis when diagnostic clinical signs are present. This patient made an apparently spontaneous recovery, was free of recurrence three months later but was invalided home because of residual articular pain. The histories of the patients revealed that while the beginning of meningeal inflammation cannot be determined precisely the evidence suggests that it begins about the time that severe persistent headache ensues. Such a headache was never the first symptom. Eight of the 9 patients in whom the premeningitic period lasted more than one day gave a history of localized articular pain, associated with localized muscular pain in 6 and with cutaneous lesions in 5. The 5 with a premeningitic period of more than a week gave a history of remissions and relapses. In 3 of the 6 in whom the premeningitic period was less than one day the symptoms were similar to those of the patients without meningitis. In addition to the usual symptomatic treatment, sulfapyridine was used as for the ameningitic patients but was continued for ten days, and a total of 40 Gm. was given. The dose by mouth was usually augmented by the intravenous administration of 2 to 4 Gm. of sulfapyridine sodium at the onset of treatment. Of the 16 patients, 12 made a rapid and complete recovery in three to five days, 2 are still ill and 2 died. There is no reason to suppose that a peculiar susceptibility or resistance of the host was operative in this series. Organisms of several different agglutinative types were recovered, and their difference apparently excludes the possibility that a special characteristic of the organism was important in determining the course of the infection.

Tubercle, London

22:231-256 (Oct.) 1941

Bronchial Obstruction in Pulmonary Tuberculosis. P. R. Allison.—p. 231.

Diagnostic and Prognostic Value of Estimations of Free Sugar in Pleural Effusions. E. Nassau.—p. 249.

Schweizerische medizinische Wochenschrift, Basel**71:1193-1228 (Oct. 18) 1941. Partial Index**

- Therapy of Parenchymal Diseases of Liver. W. Nonnenbruch.—p. 1193.
- Action of Ephedrine in Myasthenia Gravis. J. H. Burn.—p. 1196.
- *Practical Experience with Depot Therapy of Adrenal Insufficiency. S. Thaddea.—p. 1202.
- Recidivations of Infantile Acrodynia. M. Péhu.—p. 1207.
- Therapy with Organic Phosphorus Preparations. E. Burgi.—p. 1209.
- *Therapy of So-Called Idiopathic Spontaneous Pneumothorax. A. Brunner.—p. 1210.
- Therapy of Ménière's Vertigo. E. Lüscher.—p. 1218.
- *Therapy of Scabies with Benzyl Benzoate. W. Lutz.—p. 1224.

Depot Therapy of Adrenal Insufficiency.—At Thaddea's clinic 7 patients with Addison's disease were treated by subcutaneous implantation of desoxycorticosterone acetate. Best results were obtained when from 100 to 200 mg. of the substance was implanted. The improvement of the adrenal insufficiency which follows the depot therapy persists for three to six months. It not only becomes manifest in the subjective condition of the patients but can be demonstrated by objective functional tests. A noteworthy advantage of this form of treatment is the considerable saving of the crystalline substance. The author concludes that the depot treatment with desoxycorticosterone acetate is a valuable addition to the therapeutic armamentarium in chronic adrenal insufficiency.

Treatment of Idiopathic Spontaneous Pneumothorax.—According to Brunner, spontaneous pneumothorax is not always of tuberculous origin but may be caused by the rupture of emphysema blebs. Nontuberculous spontaneous pneumothorax may be mistaken for cardiac disorders or emphysema; it may become manifest in a gradually increasing dyspnea. The fact that the author observed 3 cases in three months indicates that it is not as rare as is assumed. If the excess pressure threatens the patient's life it must be immediately counteracted. Relieving the pressure frequently permits the lung to reexpand to such an extent that it adheres to the thoracic wall and closes the pulmonary fistula. If the pneumothorax shows no tendency to decrease or if it increases in spite of repeated removal of air the aim of the treatment is to close the pulmonary fistula. In cases of tension pneumothorax the author uses valvular drainage. In cases of spontaneous pneumothorax not accompanied by severe dyspnea pneumothorax must be corrected so that respiration is facilitated and escape of air from the lung is prevented. This requires control of the pressure in the thorax by means of a pneumothorax apparatus. In many cases spontaneous pneumothorax heals in a short time under this treatment; in others the pulmonary fistula closes spontaneously. Pulmonary fistulas with wide openings require prolonged suction drainage.

Therapy of Scabies with Benzyl Benzoate.—The benzyl benzoate method of treating scabies was introduced by Nielsen of Copenhagen in 1912. Lutz employs a mixture of 300 parts of benzyl benzoate and 600 parts of spiritus saponis Hebrae. This mixture is more homogeneous and adheres to the body better than did the original mixture. Lutz employed it with satisfactory results in 160 cases. There were no relapses, as was sometimes the case with the old soft soap-sulfur treatment. Itching subsides at once. Application is more rapid and simple than with the soap-sulfur method. The disadvantage of the method is that it causes a burning sensation of the skin. This can be lessened by giving the preliminary soft soap bath, according to Kissmeyer's simple method rather than with a previous application of soap, ten minutes' waiting and brushing in the bath.

Hospital, Rio de Janeiro**20:855-998 (Dec.) 1941. Partial Index**

- Riboflavin and Pyridoxine in the Tuber of *Dioscorea Brasiliensis*-Willd. C. Camargo Nogueira and F. A. de Moura Campos.—p. 855.
- *Histamine in Therapy of Ménière's Disease. A. Monteiro.—p. 865.

Histamine in Therapy of Ménière's Disease.—Monteiro reports the case of a woman aged 38 who for many years had typical Ménière's disease. The patient was allergic, and there were allergic members in the family. Administration of quinine and estrogen in large doses failed to relieve the symptoms. She was given an intradermal injection of histamine solution in a dose of 0.25 mg. every four days for six doses. The patient apparently was cured. Discontinuation of the therapy resulted

in recurrence of the symptoms. Administration of a new series of twelve histamine intradermal injections again controlled the symptoms. The author believes that Ménière's disease is an allergy to organic histamine. The intradermal injection of small doses of histamine produce desensitization of the patient through which the allergy is controlled.

Pediatria Prática, São Paulo**12:233-294 (July-Aug.) 1941**

- *Roentgenologic Diagnosis of Acute Pulmonary Disorders and Their Complications in Children. A. Pires de Campos and A. Delmanto.—p. 233.
- *Encephalitis Following Measles. G. de Mattos and P. Refinetti.—p. 255.

Roentgenologic Diagnosis of Acute Pulmonary Disorders.—Infectious pleuropulmonary diseases of childhood produce extremely diverse clinical pictures. Meteorism and abdominal pain frequently are the initial symptoms. They are caused by intestinal hyperemia and by the central nervous reflexes so common in childhood. Pires de Campos and Delmanto present clinical histories of 12 children with acute pulmonary disease. One child presented signs of appendicitis, but careful examination disclosed a pneumonic focus in the right pulmonary apex. Hepatobiliary symptoms and neuralgic pains in the scapulohumeral region were other early symptoms of acute pulmonary disease. The authors emphasize the diagnostic importance of roentgenologic examination of the thorax in cases in which the symptoms are doubtful or difficult to interpret.

Encephalitis Following Measles.—Because of its comparative rarity, de Mattos and Refinetti report 2 cases of encephalitis following measles. The first patient was a boy aged 4 who had diffuse encephalomyelitic symptoms, optic neuritis and blindness. The general condition was greatly improved a month after the onset of the disease, and the neurologic symptoms had nearly all disappeared, except for the blindness. The second patient was a girl aged 18 months who had symptoms of parkinsonism five days after an attack of measles. A permanent cure followed in the course of a month.

Acta Chirurgica Scandinavica, Stockholm**85:455-556 (Oct. 31) 1941. Partial Index**

- Late Death After Lightning Burns: Case. H. Sjövall.—p. 455.
- Chemical and Roentgenocrystallographic Studies on Concrements from Urinary Tract. A. T. Jensen.—p. 473.
- Chondromatosis of Knee Joint. S. Radner.—p. 487.
- Renal Cyst with Peculiar Concrement Formation: Case. P. Rudström.—p. 501.
- *Cholesterosis of Gallbladder. O. Arnell.—p. 511.
- Fractures of Neck of Radius in Children. A. Roosvall.—p. 540.

Cholesterosis of Gallbladder.—Arnell designates as cholesterosis of the gallbladder a condition which has been called strawberry gallbladder, fish-scale gallbladder and the like. The condition is comparatively frequent. His observations were made on 110 patients who underwent surgical treatment at his hospital. Disturbances of cholesterol metabolism are the chief causes. Infection of bile ducts does not seem to be of etiologic importance. Cholesterol deposits in themselves do not as a rule impair the function of the gallbladder, nor do they cause symptoms. In patients coming to operation the cause of the symptoms is not uniform. In some the thickened mucous membrane, at times with callosities between the neck and the cystic duct, may produce a mechanical obstruction to the outflow of bile through the cystic duct. This explains attacks of pain and roentgenograms with poor or negative contrast filling. In other cases anatomic anomalies, such as kinks in the cystic duct, excessive development of Heister's valve or abnormal mobility of the gallbladder, constitute the basis for symptoms with cholesterosis as a contributing cause. In a number of cases in which cholesterosis is slight it is secondary to biliary disturbances of variable origin. Complications, such as infection and gallstones, may arise. Cholesterosis may be the direct cause of gallstone formation, as in the type in which polyps are formed, but this is rare. Except for this type there is probably no relationship between gallstones and cholesterosis. With the exception of the polypoid type, in which roentgenologic examination clarifies the problem, a definite diagnosis is often impossible. Late results of surgical intervention for cholesterosis were the same as those seen after cholecystectomy for cholecystitis or cholelithiasis.

THE STUDENT SECTION

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Education in Industrial Health

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TEXARKANA, TEXAS

The President's program for the manufacture of 120,000 tanks, 185,000 planes, countless anti-aircraft guns, the addition of millions of workers to our labor forces and the increase by one half during the next year of industrial employment in manufacturing, mining, construction, transportation and utilities demonstrates that the war will be won or lost on the assembly lines. The industrial worker has been given a place of special prominence in the prosecution of war efforts. Loss of working time by skilled and indispensable workers, no matter what the cause, must be classed today as casualties. The importance of the mobilization of medical facilities in order to meet the impact of the problems which are arising has been recognized for several years. The necessity for the coordination of effort of various agencies interested in the health and medical care of the defense worker has been generally admitted, and real progress has been made in defining spheres of activity and bringing about the cooperative effort which is imperative for victory.

In any discussion of this subject the terms "industrial health," "industrial medicine" and "industrial hygiene" have a tendency to become confusing, and the need of clarification of terms used is obvious. The connotations of the words "occupational" and "industrial," in relation to disease, are evidence of the necessity of a careful analysis of terms used. Industrial medicine may be considered as a science which deals with prevention, cure and alleviation of disease as it affects gainfully employed individuals. The objectives of industrial medicine have been stated to be:

1. To fit every person to types and quantities of work according to his ability to perform such work continuously without undue impairment, without injury to himself or his fellow workmen, and with profit to himself and his employer.
2. To procure and maintain fitness for work through efforts applied to the worker as an individual.

3. To educate the worker to a comprehension of the value and significance of physical and mental well-being and, in particular, of personal hygiene and accident prevention.

4. To reduce all loss of time, absenteeism and short work spans in industry the cause of which may be related in any way to health.

This concept indicates that much of industrial medicine may be beyond the field of the average practitioner and makes apparent the fact that industrial medicine is, to a large extent, the practice of medical supervision, preventive medicine and public health within the confines of industry.

Industrial health as a field of special medical interest is relatively young. Its origin, early difficulties and subsequent development are well within the memory of many physicians today. Relatively few physicians gave serious attention to safe and healthful practice in industry thirty years ago. Few physicians realized the preventive character of most occupational disorders. The rapid development of industry which gave rise to constantly multiplying hazards was followed by a lag in the development of measures, both preventive and curative, to cope with this situation. The perfection of methods of treatment and of technics of prevention by physicians, hygienists and engineering specialists in this field has been followed also by a lag in their articulation with the rank and file of practicing physicians who care for the great mass of industrial workers. The lag which has occurred is due to two factors; one is the extremely rapid development of industry in this country and the other is the failure of medical educators to give proper emphasis to the training of students, both undergraduate and graduate, and to assign to preventive medicine the place which its importance justifies. The implications of the development of industry and the change in the practice of medicine effected by workmen's compensation laws have not been sufficiently emphasized.

Experienced physicians in industry have testified that industrial health activity falls into three principal categories:

1. Industrial medical administration.
2. Industrial medicine and traumatic surgery.
3. Industrial hygiene and toxicology.

For physicians who expect to meet the ordinary medical needs of industry, proper grounding in each of these major subdivisions should be provided beginning in the undergraduate curriculum.

Medical service to industry flows through three principal professional channels:

1. The private practitioner in general or special practice serving on call or part time. Best current estimates indicate that 80 to 85 per cent of medical service to industry is supplied in this fashion. About thirty-four million individuals are employed in the industrial plants of the country. Medical care has been mainly remedial in character, to such an extent that medium sized and small plants have been left without the considerable advantages of preventive industrial medicine and surgery.

2. The full time industrial physician serving in one or several plants who exemplifies specialty practice in industrial health. In addition to prevention and treatment of compensable disability, he is concerned with the details of medical department administration.

3. The medical industrial hygienist more frequently associated with governmental agencies who provides a consultative and investigative service directly to industry and to the medical profession, as well as enforcement of public health and sanitary codes relating to conditions of work.

In each of these classifications there are definite shortages of well trained personnel. With notable exceptions the requirements of industry in the fields of industrial medicine, surgery and hygiene are being met in very incomplete and fragmentary fashion, without clear realization of objectives or their value to the health status of the community as a whole. It is clear that the medical profession has been hampered in its approach to this useful and expanding professional activity and will continue to be hampered until adequate provision is made for instruction in modern industrial health methods, both before and after graduation. To meet these varying educational requirements, medical and professional schools and medical societies singly and in combination are under heavy obligation to create or improve opportunities for training in undergraduate and continuation courses and for extended graduate study.

Since its organization in 1938, the Council on Industrial Health has stressed the importance of the care of workers in small industries, in which it is estimated that 85 per cent of industrial workers are employed. It is the general belief that the hazards of industrial poisons are present chiefly in the large companies and seldom

in the small ones. There is, however, good reason to believe that the individual worker in the small plant is exposed to more hazards or to the same hazards in more ways than the man in the large plant. A number of statistical studies indicate that absenteeism due to non-occupational accidents and diseases is greater in the small establishment than in the large. The complex problems surrounding the provision of industrial health service to this important segment of the working population has received the serious consideration of several groups. The practicing physician is one of the most important factors in the delivery of this care.

The interest of the Council in education in the industrial health field has been expressed in (1) the original report of the Committee on Scope, (2) the formation of a subcommittee on education in the Council, (3) articles on industrial medical education in the special Industrial Health issues of THE JOURNAL, (4) instructions to state and county committees and (5) the development of a syllabus for undergraduate and graduate teaching in medical schools.

The Council on Medical Education and Hospitals, after reviewing several recommendations from the Council on Industrial Health, has authorized the latter council to assume the initiative in calling to the attention of medical schools deficiencies in trained personnel for various phases of industrial practice. This council has prepared a syllabus for undergraduate and graduate levels and has reviewed the work in this field of a committee of the American Association of Industrial Physicians and Surgeons. The recommendations of the latter group are also ready for consideration.

The Council reviewed the four year medical curriculum in 1938 and found that fifty-two schools reporting averaged five hours of instruction in industrial health. A recent review by Wampler reports that fifty-one schools averaged six and seven-tenths hours, an increase in the three year period of approximately one and seven-tenths hours. Wampler's report shows that twenty schools have increased the number of hours devoted to industrial health in the past three years. In thirty-five schools, industrial health is made a part of the course in preventive medicine and public health. Schools not having special courses state that the subject is cared for in the teaching in various clinical and pre-clinical departments.

Actually, only a few medical schools have made adequate provision for this type of instruction. Industrial hygiene is widely taught as a

relatively minor function of preventive medicine and public health. Problems in industrial medicine and surgery are presented without any relation to prevention and control over exposures and only as examples happen to present themselves in clinics or wards. Industrial medical administration has been almost completely ignored. Yet the experience of a number of medical schools amply demonstrates that reasonable acquaintance with the whole subject can be provided at modest expense through judicious use of time and readily available teaching and clinical material. The all important requirement for improved instruction is a unified plan which assigns over-all responsibility for coordinated classroom discussion, field studies and laboratory and section work to one single teaching division, preferably preventive medicine and public health. There must always be considerable dependence on clinical teaching in the medical and surgical aspects of industrial practice, but the testimony of recent graduates clearly indicates that older methods of divided and unrelated instruction fail to provide dependable and reasonably complete information.

As a matter of fact, progress would be greatly accelerated if more medical and graduate schools, especially those in industrial areas, could develop or attract support for the organization of separate teaching divisions in industrial health, each with its own faculty, and develop affiliations for clinical and demonstration material and facilities for laboratory and field investigation and consultation. Good precedent exists for independent organization of this character. Under such an arrangement there should be greatly improved prospects for the attraction of special teaching talent and material and of support for research into numerous aspects of industrial health demanding investigation and for the promotion of advanced training at graduate and fellowship levels.

One attitude toward the teaching of industrial health in the undergraduate years is that this subject should be included in the teaching of various specialties and that it should not be taught as a separate course and in a special department. The same attitude has been maintained with respect to the teaching of public health and preventive medicine. It is the opin-

ion of the Council on Industrial Health that instruction in industrial health should be carried out under a separately organized department and with a definitely outlined curriculum. The syllabus prepared by the Council and the outline of instruction prepared jointly by the Council and the Committee of the American Association of Industrial Physicians and Surgeons are available for consideration.

Discussions of the problems of undergraduate teaching of industrial health in the last few years have resulted in general agreement that medical schools have an opportunity, through this channel, to influence the lives of millions of workers. The important services which physicians render are four: conservation of health, the treatment and when possible the arrest of incipient disease, the restoration of the sick to health and the relief of suffering. The relative importance of these functions is not generally recognized and, were medical educators to give proper emphasis to the training of students in preventive medicine and public health, it might well constitute their most important contribution to the reduction of the cost of medical care.

"In his work *Affections*, Hippocrates says 'I may venture one more question: What occupation does he follow?' Though this question may be concerned with the existing causes yet I regard it as well timed or rather indispensable, and it should be particularly kept in mind when the patient to be treated belongs to the working people. In medical practice, however, I find that attention hardly ever is paid to this matter." This quotation, which has such a direct bearing on the problems which we are discussing today, was written over two centuries ago by Ramazzini. The present emergency should create, through education, opportunities for competent physicians in all industries, large and small, not solely as a contribution to the preparedness effort but as a continuing activity in the field of preventive medicine. In the past the health needs of industry have been supplied by a small group of full time practitioners and hygienists, almost all of whom have developed without formal training, and a vast group of private practitioners who have been interested in remedial and reconstructive action almost to the exclusion of prevention.

DO YOU KNOW WHAT PHYSICIAN—

1. Was a leading American neurologist, a trustee of the University of Pennsylvania and also a famous novelist and poet?

2. Compiled a general index to British and foreign literature known as *Bibliotheca Britannica*?

(The answers are on page 1022.)

Medical College News

Medical schools, hospitals and individuals will confer a favor by sending to these headquarters original contributions, reviews and news items for consideration for publication in the Student Section.

Northwestern on Accelerated Schedule—Blood Donors

Northwestern University Medical School, Chicago, has adopted the accelerated war schedule and is now to be in session throughout the year on a quarterly basis. Every nine months a new group of freshman students will enter. The first group starts late in the month of June, and a full quota of seniors will be graduated at equal intervals after completing about three years of constant study. It is inspiring, our correspondent writes, to realize how efficiently the members of the staff who did not leave with the Northwestern General Hospital unit have maintained adequate teaching. In addition to the classes in military and tropical medicine for juniors and seniors, chemical warfare is taught on Saturday afternoons to sophomores, juniors and seniors. At least 95 per cent of Northwestern medical students have donated a pint of blood to the American Red Cross under the plan adopted and organized by the interfraternity council. The total will be approximately 500 pints. The local air raid protection units which are being organized in Chicago as in other cities may include medical students. It is proposed that each medical fraternity form a team of older students so that men will always be at hand from each group to aid in transportation or dressing of the wounded. These changes in student life offer financial difficulties to many. However, the university has outlined a student loan policy whereby the student can make his way without a summer job.

New York University Student Loan Fund

The freshman class at New York University School of Medicine, New York, held a dance, February 14, attended by many of the faculty members and about one hundred couples. The proceeds were given to the Student Loan Fund. Another dance was given March 14 for the Student Loan Fund by the general student body. In view of the three year curriculum recently put into effect to aid in the war effort, the financial problems of many students who depend on summer work to aid them has become acute. The Student Loan Fund is making an extra effort to be in a position to aid as many students as possible.

Johns Hopkins

Most of the students at Johns Hopkins University Medical School, Baltimore, have subscribed to courses in first aid being given by the Johns Hopkins Hospital staff members, which will continue once a week in the evenings for fifteen weeks. A second course is given for the same length of time for instructors in first aid. Both courses are sponsored by the American Red Cross. A new gymnasium was opened on December 3, 1941. The gymnasium is open not only to students but to members of the faculty and hospital staff.

Annual Student Meeting

The section on medical history of the College of Physicians of Philadelphia held its annual student meeting on December 8 with the following program: Dr. Robert A. Groff, Historical Aspects of Neurosurgery; Stanford Mulholland, "Development of Modern Urology," and Isidor S. Ravdin, "Some Contributions of American Surgery to the Art and Science of Medicine."

Louisiana's February Commencement

The class at Louisiana State University School of Medicine which ordinarily would have graduated in June graduated February 18 and, according to the dean, Dr. B. I. Burns, is one of the first, if not the first, class to graduate in this country under the accelerated program. Of the eighty members of the class who were eligible for commission in the Army, Navy or Public Health Service, 81 per cent have applied for commissions. The commencement speaker was Dr. C. S. Boucher, chancellor of the University of Nebraska and formerly dean of the College of Arts, Literature and Science at the University of Chicago, and president of West Virginia University. The dean announced that F. E. McCarty had received the award in obstetrics and gynecology, George A. Degenshein the award in medicine, Dionisus V. Cacioppo the awards in surgery, pediatrics and urology, and that Walter M. Woodward was awarded the George S. Bel Memorial Prize.

Columbia University

During the academic year 1940-1941, there were one thousand one hundred and forty-four applicants for admission to the school of medicine of Columbia University, New York, for the coming year; in the first year class for the last academic year 110 students were enrolled. According to the report of the dean, the class graduated obtained internships in fifty-five different hospitals in all sections of the country; Theodore Gold was awarded the Janeway Prize given to the member who ranked highest in efficiency and ability; Paul A. Kirschner was given the William Perry Watson Prize for outstanding work in the study of the diseases of children; William Stone Jr. was awarded the Thomas F. Cock Prize for a thesis entitled "Studies of Inclusion Blennorrhoea Virus in the Genitourinary Tract," and Clarence J. D'Alton was given the Harold Lee Meierhof award for "conspicuous effort in pathology." The employment office of the medical school helped two hundred and thirty-nine students to obtain steady positions and one hundred and sixteen to obtain temporary jobs, exclusive of thirty-two positions provided by the National Youth Administration. About 45 per cent of the student body seek employment while they are in medical school.

The medical school offered two hundred and thirty courses in its postgraduate program during the year, designed and attended by physicians in general practice. Many new courses in the postgraduate program were introduced during the year, with emphasis primarily on recent advances in methods of diagnosis and treatment and interpretation of diagnostic laboratory procedures. During the year nine hundred and eighty-eight physicians were registered for postgraduate study and, while most of them were from the New York metropolitan area, physicians from forty-three states, four territories and twenty foreign countries were in attendance. The increased enrolment of Latin-American physicians was indicative of the importance of the program in promoting exchange of mutual interest among the medical profession of the Western Hemisphere. At commencement there were awarded one hundred and four degrees of doctor of medicine, thirteen of doctor of medical science, twenty-two of master of science (public health) and fourteen of bachelor of science (nursing).

Pennsylvania Undergraduate Medical Association

The Undergraduate Medical Association at the University of Pennsylvania School of Medicine will hold its annual meeting for presentation of student research on April 9. All classes in the medical school will be suspended on this day in order that all may attend the meeting. The program will consist of three formal lectures and a number of student research papers. Awards will be made for the outstanding papers. At open meetings throughout the year the Undergraduate Medical Association presents speakers of special interest. On December 11 Dr. Russell Wilder of the National Research Council spoke on "Nutrition in National Defense," and on February 5 Capt. C. H. Stevens of the Bureau of Medicine and Surgery of the United States Navy spoke on "Military Medical Observations in England." Dr. Louise Pearce of the Rockefeller Foundation at Princeton, N. J., will address the annual open meeting of the Women's Medical Society on April 10. She will speak on some phase of the work in experimental syphilis.

Louisiana's Circle Society

The honor scholastic society of Louisiana State University School of Medicine, New Orleans, known as the Circle, was founded in the spring of 1940 to give recognition to students of unusual scholastic ability. The membership consists of 10 per cent of the senior class, three members of which are selected in their junior year. The senior members just recently elected are George A. Degenshein, Rudolph J. Marshall Jr., Charles D. Muller Jr., Morris Ruchelman and Malter A. Salatch. The new junior members of the Circle are Daniel W. Beacham, Norman Burnstein and Douglas Lindsey. The faculty advisers of the Circle this year are Drs. James D. Rives, professor of clinical medicine; Charles Midlo, assistant professor of anatomy, and Dr. Burns.

Annual Lectureship at Tennessee

The local chapter of Phi Beta Pi medical fraternity at the University of Tennessee College of Medicine, Memphis, has established an annual lectureship at the university. Each year some representative of a specialty will lecture to the student body and the Shelby County physicians. The initial speaker was Dr. Karl A. Menninger of Topeka, Kan., president of the American Psychiatric Association, who discussed "Personality Studies as a Function of the Private Physician."

Texas Fraternity Sponsors Lectures

The Alpha Nu chapter of Phi Rho Sigma medical fraternity at the University of Texas Faculty of Medicine, Galveston, has established the Phi Rho Sigma Lectureship in honor of deceased alumni of the chapter. The first lectures were delivered, December 1, by Dr. Rolla E. Dyer, chief, division of infectious diseases, U. S. Public Health Service, Washington, D. C., on typhus fever, and Dr. Russell L. Cecil, professor of clinical medicine, Cornell University Medical College, New York, on rheumatoid arthritis.

Sigma Xi Lecture

Under the auspices of the University of Cincinnati chapter of Sigma Xi, a lecture on bacterial nutrition as a tool in biologic chemistry was given at the college of medicine, January 29, by Milan A. Logan, Andrew Carnegie professor of biologic chemistry at the college of medicine. The lecture was open to the public.

Residents to Honor Dr. Barr

The resident physicians who had served under Dr. David P. Barr during the last seventeen years, at Washington University School of Medicine, St. Louis, at a recent dinner in Dr. Barr's honor, formed a committee to raise funds to have Dr. Barr's portrait painted. The chairman of the committee was Dr. Lee D. Cady and the treasurer, Dr. Leon Bromberg. The portrait has been finished and accepted by the committee which hopes to arrange a presentation ceremony soon for presentation of the portrait to the medical school. The artist was Mr. Charles F. Galt. The contributions to the fund have been to date exclusively from former house officers and interns who served with Dr. Barr. Dr. Barr recently became professor of internal medicine at Cornell University Medical College, New York. He is also a member of the Council on Pharmacy and Chemistry of the American Medical Association.

California Lectures to Students on War Medicine

The Committee on Medical School Curriculum of the University of California is sponsoring a series of lectures on war medicine to be given on Wednesdays from 3 to 4 p. m. at the University Hospital, San Francisco, constituting a voluntary course for third and fourth year medical students. Members of the faculty, the resident staff and the medical profession are cordially invited. The series will comprise the following lectures:

- March 4, Burns; Replacement Therapy, Leon Goldman, assistant professor of surgery.
- March 11, Wounds; First Aid to Injured; Orr or Trueta Treatment, H. Glenn Bell, assistant professor of surgery.
- March 18, Fractures as Related to the Army, LeRoy C. Abbott, professor of orthopedic surgery.
- March 25, Fractures, Sprains, Care of Feet, LeRoy C. Abbott.
- April 1, Head Injuries; Back Injuries; Peripheral Nerve Injuries, Howard C. Naffziger.
- April 8, Infectious Diseases—Scarlet Fever, Diphtheria, Mumps, Measles—Under Wartime Conditions, Salvatore P. Lucas, associate professor of medicine.
- April 15, Malaria, Syphilis, Plague, Cholera, Influenza, Dysentery, Typhus, Yellow Fever: Epidemiology and Prevention of These Diseases Under Wartime Conditions, Karl F. Meyer, Ph.D., professor of bacteriology.
- April 22, Chemical Warfare; Gas Poisoning, Joel H. Hildebrand, Ph.D., professor of chemistry.
- April 29, Vitamins and Nutrition, Gordon E. Hein, associate professor of medicine.
- May 6, Aviation Medicine, Mayo H. Soley, assistant professor of medicine and pharmacology.

Hayden Scholars at Tufts

Dr. Cadis Phipps, professor of medicine and chairman of the scholarship committee at Tufts College Medical School, Boston, has announced the names of the first recipients of the recently established Charles Hayden Memorial Scholarships. These awards are made on the basis of individual need and promise to students who intend to enter general medical practice, and they average \$250, which is applied to the first year tuition. The names of the first Hayden scholars at Tufts, all of whom had college degrees, follow:

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| Ward Allen Albro, Winchester | George Benson McManama, Waltham |
| Frank Anthony Avola, Boston | Stanley J. Mikalonis, South Boston |
| George Raymond Bancroft Jr., Winchester | Edward Stephen Murphy Jr., Belmont |
| Louis Burke, Chelsea | Morris Supowitz, Chelsea |
| Joseph Lewis Cafarella, Malden | John DeValera Sweeney, Waltham |
| Robert Cole Cornell, Mountain Lakes, N. J. | George James Tsolas, Watertown |
| Brendan Forest Crotty, Jamaica Plain | George Loughlin Tully Jr., West Newton |
| Alfred Albert Delery, Somerville | Langston Pray Wagner, Wellesley |
| Gordon Nichols French, Newton Centre | William John White, Jamaica Plain |
| Leon Herman, Brighton | |
| Francis Daniel McCarthy, Chelsea | |
| David Edgar McGaw, Winthrop | |

Alpha Omega Alpha

A chapter of Alpha Omega Alpha, honorary medical society at Wayne University College of Medicine, Detroit, was installed, February 19, at a formal dinner. Dr. Walter L. Bierring, Des Moines, national president of Alpha Omega Alpha and Past President of the American Medical Association, and Dr. J. J. Moore of Chicago, the national secretary of the fraternity, were present. The criterion on which the granting of a charter is based at a medical school is the maintenance of the highest scholastic standards over a period of years. The nucleus of the new chapter was ten prominent members of the faculty of Wayne University. Future membership will come from the ranking 10 per cent of the senior class of medical students each June. Dr. Merritte W. Ireland, formerly surgeon general of the U. S. Army Medical Corps, presided at the dinner; the address was given by Dr. Louis B. Wilson of the Mayo Clinic, Rochester, Minn.

The following June graduates at the Western Reserve University School of Medicine, Cleveland, were elected to Alpha Omega Alpha:

Robert Reese Berneike
Paul Frederick Cooper
Walter Asahel Hoyt Jr.
Edward Joseph Humel Jr.

Harvey Krieger
Simour David Pomrinse
Salvatore Mario Sancetta
Edmund Frederick Schroeder
Austin Stanley Weisberger

The annual prize awards of this organization at Western Reserve have been made as follows:

Austin Stanley Weisberger, first prize, for his paper on "The Role of Specific and Nonspecific Serum Factors in Phagocytosis: A Study with *Staphylococcus Aureus Hemolyticus*."

Robert Edward Eckardt, second prize, for his paper on "Riboflavin, Its Assay, Distribution and Physiology."

The third prize was divided equally between Edward S. Ramboisek, for his paper on "A Method for the Quantitative Analysis of Tin in Tissues," and Margaret Ruth Read for her paper on "Contribution to the Mechanism of Gastric Evacuation."

Harvard Renews National Scholarships

Harvard University, Cambridge, Mass., announced, October 19, the renewal of (THE JOURNAL, Sept. 27, 1941, p. 1134) national scholarships for the following medical students:

James S. Clarke '44, LaGrange, Ill.
Martin E. Flipse Jr., '44, Douglaston, L. I., N. Y.
Winsor C. Schmidt '44, Rye, N. Y.
Louis E. Ward '43, Mount Vernon, Ill.
Allan L. Friedlich Jr. '43, New York.
Glen R. Leymaster '42, Aurora, Neb.
Clarke T. Case '42, Rymmana, Burma.
Laurence G. Wesson Jr. '42, Boston.

Society of Medical Sciences

At the annual banquet of the Louisiana State University Society of Medical Sciences, February 4, Mr. Louis Lazar was presented an award as the outstanding senior student of the year. Preceding the banquet Dan Beacham was elected president of the society for the coming year, Philip Cenac vice president and Richard Bates secretary-treasurer. The speakers at the meeting were Dr. E. L. Burns of the bacteriology and pathology department, Dr. Karl Dickens, the society's faculty adviser, and Dr. Connie Hood, a former president of the society.

Washington University Fraternity Sponsors Lecture

Dr. James Barrett Brown, associate professor of clinical surgery, Washington University School of Medicine, St. Louis, delivered the third annual Ephraim McDowell Lecture, March 3, at the Louisville City Hospital, Louisville, Ky., on "The Treatment and Skin Grafting of Burns." This lectureship is sponsored annually by the local chapter of the Phi Beta Pi medical fraternity of the University of Louisville School of Medicine.

"DO YOU KNOW WHAT PHYSICIAN"

Following are answers to the questions appearing on page 1019:

1. Silas Weir Mitchell (1829-1914) of Philadelphia. Dr. Mitchell graduated from Jefferson Medical College in 1850 and spent the following year studying in Paris, where he came under the influence of Claude Bernard. His father was a physician, as were several other ancestors. With Surg. Gen. William A. Hammond in 1859 Mitchell investigated the arrow poisons *corroval* and *vao* and was the first, after Felice Fontana and Bonaparte, to investigate serpent venoms. In 1864 Mitchell, Morehouse and Keen published an important work on gunshot and other injuries of the nerves, which was translated into French and used in the French hospitals during the first world war. This work contains the earliest distinct accounts of ascending neuritis. Mitchell was the first to describe *causalgia* in 1864, *erythromelalgia* in 1872-1878 and *postparalytic chorea* in 1874. Mitchell introduced in 1875 a treatment of nervous disease by prolonged rest in bed, together with optimum feeding, massage and electricity, which came to be known as the Weir Mitchell treatment, or the "rest cure." His ideas were summarized in a classic monograph, "Fat and Blood," published in 1877 and translated into several foreign languages.

Mitchell was the author of one hundred and seventy-one medical papers on a variety of subjects, including neurology, toxicology, pharmacology and physiology. He was a commanding figure, a charming personality, and combined the high standards of the practitioner, investigator, clinician and research worker. In the world of letters Garrison places Mitchell near Goldsmith and Holmes and not far below Scott and Lamb. He was admired by all who knew him. Among his close friends were Holmes, Osler, Jacobi, Welch, DaCosta, Hammond and Billings.

Mitchell was awarded numerous national and international honors. He was a trustee of the University of Pennsylvania for thirty-five years. His patients came from many states to Philadelphia. He organized the library of the College of Physicians of Philadelphia, which through his efforts became one of the great medical libraries of the country. He contributed to the reform of methods of treating the insane. He, with DaCosta and Gross, founded the Philadelphia Pathological Society. His book "Hugh Wynne, Free Quaker," published in 1897, is one of the best historical novels in American literature.

2. Robert Watt (1774-1819). The *Bibliotheca* is a lasting monument to him, as it has been of great service to librarians and bibliographers. This stupendous task was practically complete when he died, but not entirely so until five years later. The idea seems to have originated in Watt's mind about the time he matriculated as a student in 1793. Watt studied medicine in Glasgow and was the first president of the Glasgow Medical Society. On his death the Faculty of Physicians and Surgeons gave his widow a pension of £45 a year, which she continued to draw until her death thirty-seven and a half years later. A daughter, the only surviving child, is said to have died in the poorhouse in 1864, and among her possessions were two sacks full of slips of paper, which turned out to be the manuscript of the *Bibliotheca*. The manuscript was purchased privately and presented to the Paisley Free Library, where the slips are now properly preserved and arranged in sixty-nine volumes—fifteen for authors and fifty-four for subjects. According to Monro's book "The Physician as Man of Science, Letters and Action," the *Bibliotheca* consists of four large quarto volumes, the first two containing the names of more than forty thousand authors with particulars of their work. The second part contains all the books mentioned in the first part arranged by subject.

Book Notices

Eye Hazards in Industry: Extent, Cause, and Means of Prevention. By Louis Resnick. Published for the National Society for the Prevention of Blindness. [New edition.] Cloth. Price, \$3.50. Pp. 321, with 33 illustrations. New York: Columbia University Press, 1941.

The chances which American workmen take with such irreplaceable organs as eyes are a constant source of amazement to physicians and safety workers. Eye hazards in industry are in the majority of cases unnecessary. The author, Mr. Louis Resnick of the National Society for the Prevention of Blindness, who lived and died fighting this tragic waste, has assembled an overwhelming indictment against American industry and American workmen who persist in being careless about eye safety. According to his estimate, a painful eye injury occurs every thirty seconds, a total of more than three hundred thousand annually costing some \$200,000,000 and more for all the attendant charges for treatment, compensation and rehabilitation which inevitably accompany these disabling accidents. Ninety-eight per cent of traumatic injuries to the eye are preventable, mainly through the simple device of protective goggles or eye shields. All the reliable methods of control are included in this book. Adaptation of personal and environmental protection to specific trades is amply illustrated in respect not only to solid foreign bodies but to exposure to radiant energy, chemicals and other toxic substances as well.

Trauma alone is not the only hazard to eyes in shops and mills. Almost as great a challenge is presented by the problem of detecting and correcting defective vision. It is clearly desirable to associate workmen with employment adapted to their physical abilities, and certainly eyesight must be given careful consideration. The question, then, of visual appraisal in industry is of great interest and importance. It seems sensible to recommend, and this book does, that the eyes of all applicants for work be examined, that placement in work occur according to the visual ability of the applicant with such correction as is necessary, and that consideration be given to the best ways by which employees can obtain glasses. Periodic eye examinations also should occur at varying intervals, depending on age and the severity of visual defects.

In addition, reliable information is given about standards for illumination in work places and for varying degrees of eye concentration. Certainly this aspect of better working conditions has been greatly neglected. Other sections of the book on education and supervisory methods of control, compensation data and the like give the same impression of careful and dependable preparation. Every page is an argument to shops and workmen everywhere who, in respect to eye injuries, say "It can't happen here!" It does happen and to the tune of one hundred totally blind and a thousand single eyes lost to workers, to industry and to society each year.

Soft Coal Miners' Health and Working Environment. By Robert H. Flinn, Passed Assistant Surgeon, United States Public Health Service, et al. From the Division of Industrial Hygiene, National Institute of Health. Prepared by direction of the Surgeon General. Federal Security Agency, U. S. Public Health Service. Public Health Bulletin No. 270. Paper. Price, 25 cents. Pp. 118, with 36 illustrations. Washington, D. C.: Supt. of Doc., Government Printing Office, 1941.

This bulletin is a report of a study of the physical condition of 545 soft coal miners and the health hazards of their working environment in three bituminous coal mines in Utah, conducted by the United States Public Health Service, Utah State Board of Health and other Utah state agencies. The physical evaluation of the miners included complete histories, examination and laboratory procedures indicated by type of exposure. The environmental studies were made in each mine to determine the health hazards of particular occupations. The results indicated that the dustiest occupations are associated with the underground operations. The dustiest occupations above ground were in the tippie, sand driers and dummy makers. The range was from 11,000,000 particles per cubic foot of air to 119,000,000. Petrographic studies showed 11 per cent free silica as the highest content, also that 83 per cent of the particles were less than 5 microns in diameter, the median being 1.94 microns. Exposure to gas, except to carbon monoxide immediately after blasting, did not occur.

Only data on miners with no other dust exposures were included in the results of the physical examination. Anthracosilicosis, a modified form of silicosis due to silica mixed with large amounts of carbon dust, was the principal occupational disease found. It may occur during the mining and processing of either anthracite or bituminous coal. Diagnosis was based on x-ray examination, symptoms and physical findings and the history of several years' exposure. Anthracosilicosis was found in 16 (3.2 per cent) of the 507 included. Fifteen of the 16 workers showed evidence of first stage involvement with but little disability; 1 worker showed evidence of second stage anthracosilicosis with moderate disability, and in no instance was third stage anthracosilicosis found. It was found only in workers whose principal occupation was underground. The incidence increased with increasing weighted average dust concentration and increasing duration of employment. The disease was not found among workers with less than ten years' employment in bituminous coal mines and was found in only 2 instances among workers with an average weighted dust exposure of less than 20,000,000 particles per cubic foot of air. As to dust concentrations above this level, duration of employment was important. The incidence of anthracosilicosis rose from 3.9 per cent in workers employed ten to nineteen years to 11.1 per cent in those employed twenty to twenty-nine years and to 50 per cent for the 12 workers employed thirty or more years.

The incidence of pulmonary tuberculosis was of minor importance, only 3 of the 507 workers showing minimal activity. Only one minimal healed lesion was found among workers with anthracosilicosis.

Other occupational hazards did not appear to be of significance. As a group, the health of these bituminous coal mine workers was found to compare favorably with that of workers in other dusty trades. There was improper sewage disposal in the mines and adjacent communities.

Directions for proper medical supervision and control of dust hazards are given.

Chemical Analysis: A Series of Monographs on Analytical Chemistry and Its Applications. Editorial Board: Beverly L. Clarke, I. M. Kolthoff, and Hobart H. Willard. Volume II: Chromatographic Adsorption Analysis. By Harold H. Strain, Ph.D. Cloth. Price, \$3.75. Pp. 222, with 38 illustrations. New York: Interscience Publishers, Inc., 1942.

The technic of chromatographic adsorption analysis, a useful and relatively new tool of the modern investigator, was initiated in 1909 by the Russian botanist Tswett, who was interested in the nature of leaf pigments. Essentially, "chromatographic analysis" or "chromatography" involves a suitable adsorbent, such as talc, aluminum oxide or sugar, packed into an appropriate glass tube to form a column, through which may be aspirated a solution of the pigments under investigation. Owing to differences in the adsorptive properties of the pigments in the mixture, proper treatment with fresh solvent causes various colored bands to form in the column, each band denoting a particular pigment. Physical separation of the adsorbent column into its component colored zones, followed by elution of the adsorbed material, results in a separation of the pigments of the original mixture. The series of colored bands obtained during the process is called a "chromatogram." This name is somewhat poorly chosen, for in recent years the technic has been applied with success in the separation of many colorless substances.

In this book the author has collected for the first time the large amount of experimental data relative to chromatographic analysis which has accumulated since its inception. In a clear, concise style he discusses applications of the chromatographic method, the apparatus and technic involved, the selection, preparation and properties of the adsorbents employed and the selection and properties of solvents and eluants. Numerous diagrams of apparatus are provided. One chapter is devoted to the location of colorless adsorbed substances and another to the chromatography of inorganic compounds—relatively recent developments which are suggestive of future trends in this field. The chromatography of organic compounds is extensively discussed, with numerous references to original literature, in a chapter which illustrates the importance of this technic in the investigation of natural substances. A chapter on industrial applications is included. The book is an excellent summary of chromatographic adsorption analysis.

Operative Oral Surgery. By Leo Winter, D.D.S., M.D., F.A.C.D., Professor of Oral Surgery, New York University, New York. Cloth. Price, \$10. Pp. 877, with 1,019 illustrations. St. Louis: C. V. Mosby Company, 1941.

As indicated in the foreword and elsewhere, this book is written primarily for the dental profession. Nevertheless, any one interested in oral surgery will find much information of value. The diagnosis and treatment of most of the common lesions about the mouth are well described, and many of the illustrations are excellent. There may be a superabundance in some instances, seventeen drawings being used to illustrate looping a circumferential wire around the lower jaw and twenty-three depicting the placing of a wire near the angle for external traction. Although two hundred and twenty pages are devoted to fractures of the jaws, less than two of these pages concern injuries of the upper jaw. The reader might gain the impression that maxillary fractures usually stop at the upper border of the alveolus, as no mention is made of their frequent extension through the antrum and the orbital floor. The treatment of condylar fractures also is omitted, though the author states that in his experience they have been the least frequent of mandibular breaks. The common minor operations about the mouth are well described and illustrated, but the possible hazards in some of the more formidable procedures are not discussed. For instance, in the description of open section of the ramus for ankylosis no mention is made of the considerable danger to the upper branches of the facial nerve. The treatment of carcinoma in and about the mouth is not included. The book should find wide use as a textbook for medical and dental students and for practitioners interested in the subject. The large number of instructive roentgenograms is one of its pleasing features.

Advances in Enzymology and Related Subjects. Edited by F. F. Nord and C. H. Werkman. Volume I. Cloth. Price, \$5.50. Pp. 433, with 56 illustrations. New York: Interscience Publishers Inc., 1941.

This publication presents a collection of ten independent monographs devoted to special topics in enzymology: protein structure; Physikalisch-chemische Gesichtspunkte zum Problem der Virusaktivität; the specificity of proteinases; metabolic generation and utilization of phosphate bond energy; the chemical nature of catalase; enzymes and trace substances; photosynthesis, facts and interpretations; the bacterial photosyntheses and their importance for the general problem of photosynthesis; Untersuchung enzymatischer Prozesse in der lebenden Pflanze; and Die Verdauung bei den niederen Vertebraten. Each of these monographs is written by investigators who are recognized as authorities and have themselves contributed extensively to the original literature of the subject. No attempt is made to cover all the recent findings in the broad field of enzymology, but rather each of the selected topics is discussed from the point of view of its present day status. The scope of each subject covered is of a sufficiently limited character for it to be possible for each to be dealt with completely. The editorial policy closely resembles that of the German yearbook *Ergebnisse der Enzymforschung*. This is readily understood, since Dr. Nord was an editor of this publication. The text is free of both factual and mechanical errors. This volume is of primary interest to investigators in enzymology and the allied field of photosynthesis. However, the subject matter should attract the interest of many physicians, biologists and chemists.

Tratamiento moderno de las anemias. Por el Dr. A. H. Müller, médico director de la Sección de medicina interna del Hospital municipal de Glogau. Traducido del alemán por el Dr. J. María de Bernardo. Paper. Pp. 95. Madrid: Ediciones Morata, 1940.

This is a collection of twenty short essays intended principally for the general practitioner and dealing with the treatment of various types of anemia. The subject is exposed in the didactic lecture style, so that the reader is frequently confronted with categorical statements on controversial questions, inevitable in a work of this type. No formal classification of the anemias based on morphologic or pathophysiologic grounds is offered. The anemias are discussed principally from the standpoint of the disease with which they are associated, with the exception of addisonian pernicious anemia, which receives an adequate discussion from the pathophysiologic point of view. The principles of therapy advanced by the author are generally sound and in

accordance with modern concepts, but many proprietary pharmaceutical preparations are recommended without any information being given concerning their composition. The literature cited is almost entirely German. The contributions of American authors on the subject of anemias of the addisonian and iron deficiency types are not given the proper prominence. Though nutritional factors are stressed when the author is dealing with anemias due to hemorrhage, no mention is made of the use of vitamin K. The book is useful for its quick, clear exposition of modern principles underlying the treatment of anemia, though its value is definitely impaired by the shortcomings mentioned.

Pathology of the Oral Cavity. By Lester Richard Cahn, D.D.S., Associate Professor of Dentistry (Oral Pathology), Columbia University, New York. Cloth. Price, \$5.50. Pp. 240, with 166 illustrations. Baltimore: William Wood & Company, 1941.

This is a compact but inclusive treatment of the subject, with greatest emphasis on tumors and cysts, about one third of the book being devoted to them. About one fourth of the space is assigned to the discussion of the lesions of the mouth associated with systemic and general disturbances, such as avitaminoses, blood dyscrasias and endocrine disorders. Infections, dental caries, periodontal disease and pathologic changes of bone comprise the remainder. Nothing is included about actinomycosis and mercurial stomatitis; the treatment of the subject of hyperemia is not wholly satisfactory, chiefly because of failure to recognize the changes that are specifically associated with true hyperemia and congestion and the relationship of those conditions to clinical symptoms. Some minor slips occur, as on page 9, where it is stated that "viable polymorphonuclear leukocytes are resorbed back into the capillaries" instead of migrate back, and the use of the name Thomas instead of Thoma on page 127. The black and white illustrations are for the most part excellent and well chosen; there are selected references at the end of each chapter, and the index is satisfactory.

Index-Catalogue of the Library of the Surgeon General's Office, United States Army (Army Medical Library). Authors and Subjects. Fourth Series. Vol. VI.: G [including] Third Supplement, Fourth Series: Bibliography of XVI. Century Medical Authors: Abarbanel-Alberti, Salomon. By Claudius F. Mayer, M.D. Cloth. Price, \$2.75. Pp. 799; 52. Washington, D. C.: Supt. of Doc., Government Printing Office, 1941.

As a supplement to the Index Catalogue of the Army Medical Library, Dr. Claudius F. Mayer, editor of the Index Catalogue, has made available a "Bio-Bibliography of XVI. Century Medical Authors." The book appears with an extensive introduction. Here is an exceedingly important reference work for every person who is even slightly interested in medical history. In alphabetical order will become available the names of those who contributed to medical literature in the sixteenth century, with practically a complete list of books they have written and with a good deal of information as to the general character of these books and the various editions that have been published. The biobibliography will be condensed in subsequent volumes of the Index Catalogue. The present number covers only the material from Abarbanel to Alberti. For the more important authors there are reproductions of paintings, title pages of books and brief biographic notes.

Surgical Practice of the Lahey Clinic, Boston, Massachusetts. Cloth. Price, \$10. Pp. 897, with 376 illustrations. Philadelphia & London: W. B. Saunders Company, 1941.

This book represents a cross section of Lahey Clinic surgical work as practiced today, its diagnostic measures, technics, methods and results. While the numerous papers published here have been recently published in various journals, this volume is not a mere compilation but is the product of the actual experience of Lahey Clinic members. The headings under which the surgical operations are discussed are the thyroid gland, esophagus and lungs, breast, stomach, duodenum and small intestine, biliary tract, colon, sigmoid and rectum, pelvis, kidney and prostate gland, bones and joints, brain, spinal cord and nerves, and anesthesia. The surgical methods followed, Dr. Lahey says, represent an attempt at such standardization as will permit each surgeon to perform each surgical procedure largely in the same way. The experience of the clinic has been that, as its staff has standardized operations, it has had improved end results and decreased mortality. Many of the surgical procedures and technics are well illustrated.

Queries and Minor Notes

THE ANSWERS HERE PUBLISHED HAVE BEEN PREPARED BY COMPETENT AUTHORITIES. THEY DO NOT, HOWEVER, REPRESENT THE OPINIONS OF ANY OFFICIAL BODIES UNLESS SPECIFICALLY STATED IN THE REPLY. ANONYMOUS COMMUNICATIONS AND QUERIES ON POSTAL CARDS WILL NOT BE NOTICED. EVERY LETTER MUST CONTAIN THE WRITER'S NAME AND ADDRESS, BUT THESE WILL BE OMITTED ON REQUEST.

SOLUBILITY OF SULFONAMIDE DERIVATIVES

To the Editor:—Directions by the drug houses that make sodium sulfathiazole and sodium sulfapyridine are that the drug is to be dissolved only in distilled water. Dr. A. L. Hoyne, in a recent article on the treatment of meningitis (*The Journal*, Dec. 6, 1941, p. 1973), states that these drugs may be safely given in physiologic solution of sodium chloride but never in dextrose solution or blood transfusions. Can you tell me why it is dangerous to give these drugs in dextrose solution or in a blood transfusion?
M.D., Louisiana.

ANSWER.—One of the big problems in sulfonamide therapy has been that of solubility of the compounds, and it is for this reason that the sodium salts have been prepared. Nevertheless there is always the fear that the drugs may not be completely dissolved, and the caution has been given that they should be dissolved in water. The statement that they should not be administered in dextrose solution or blood transfusion is probably based on the fact that the drugs might become less soluble in dextrose solution or blood than in water or saline solution alone. This opinion, however, is not shared by all observers, some of whom doubt that the danger is great when the sodium salts are used. Until the problem is completely solved, however, it is probably wise to use the drugs in aqueous solution rather than to run the risk of putting them in solutions in which there might be some loss of solubility.

CHRONIC CONSTIPATION AND ENTEROLITHIASIS

To the Editor:—A woman aged 69 has been suffering from chronic constipation for decades. For the last six months or so she has been passing great amounts of intestinal gravel, consisting of magnesium and calcium phosphates and calcium carbonate. Is there any connection between chronic constipation and the formation of intestinal stones? Could you also kindly inform me as to the prevention and treatment of these calculi?
Adolf Neustadt, M.D., Riverdale, N. Y.

ANSWER.—It is not known whether a relationship exists between chronic constipation and enterolithiasis. Blix (*Acta chir. Scandinav.* 76:25, 1935) regarded intestinal stasis such as occurs proximal to a stricture or in a diverticulum to be the basic condition necessary for the formation of enteroliths in the small bowel. He further pointed out that the intestinal contents and their pH influence the chemical composition of intestinal stones and, since these conditions are different at various levels of the bowel, different kinds of calculi may be formed. When an enterolith becomes dislodged and comes to rest in a lower segment of the bowel, the outer coating may then differ in chemical composition from that of the central portion. Blix's study was based chiefly on observations made on single large enteroliths recovered at operation and is not directly applicable to the case cited. Nevertheless it is of considerable interest in connection with the entire problem of enterolithiasis. It remains to be explained, however, why for each individual who has or passes intestinal stones there are many with apparently the same set of conditions in whom calculi are not found. Obviously the factors resulting in intestinal stone formation are not clearly understood at present. Consequently there is no satisfactory medical treatment.

The fact that in the case cited the stones consisted of magnesium and calcium phosphate and calcium carbonate suggests that they were formed in the colon or lower part of the ileum. It would be desirable, however, to know the quantitative as well as the qualitative analysis of the calculi, since these minerals have been detected in stones which consisted largely of some other constituent.

Although calculi formed within the lumen of the intestinal tract are usually considered to be uncommon, it has long been recognized that olive oil or similar substances taken by mouth may result in the appearance of concretions in the stool. Presumably these consist of insoluble soaps. They may bear some resemblance to gallstones, and this has led to the erroneous belief among some people that olive oil facilitates the passage of gallstones, an idea which has been exploited by some "patent medicine" manufacturers. Since olive oil is also taken at times to relieve constipation, it would be of interest to know whether the patient has taken it regularly during the past six months.

DEFICIENCIES IN PERNICIOUS ANEMIA

To the Editor:—In an article entitled "Quantitative Treatment of Pernicious Anemia" in *The Journal*, Sept. 13, 1941 page 907, Askey states that liver is heat stable. Why was it recommended in the early days to be eaten raw or nearly so? Again he states: "It is probable that the liver is the only human organ in which it [the hemopoietic principle] is stored." I believe I am correct in stating that it is also found in the kidneys. Lilly's reticulogen has not been accepted for inclusion in N. N. R. The article states that those who received Lilly's liver extract were indicated with an asterisk. I failed to see any such mark. Again it is stated in a footnote that each cubic centimeter of reticulogen contained 100 international units of vitamin B₁₂; in another footnote the amount is boosted to 1,000 international units. Inclusion of this vitamin is responsible for the nonadmittance of this product. Most articles on pernicious anemia assume that if the reticulocyte count is satisfactory the patient needs no other treatment. I have not found this to be true. Patients suffer from diarrhea which has been attributed to the achylia, since it yields to the administration of dilute hydrochloric acid. I am of the opinion that crude liver extract—liver itself—is necessary in addition to the parenteral administration of liver extract, 15 U. S. P. units to the cubic centimeter. Patients complain of much flatus, tenesmus and a condition that corresponds to what the older clinicians termed enteralgia. The bouts come at intervals corresponding to relapse, but the blood picture is normal because of the parenteral injections. The patients improve on ingesting whole liver and dilute hydrochloric acid.

Thomas I. O'Drain, M.D., Philadelphia.

ANSWER.—The main deficiency in pernicious anemia is a storage deficiency of a specific hepatic substance. This may be replenished either directly, by supplying material from other potent animal livers, or indirectly, by supplying other organs which, when given orally, act as building material for the eventual production of the specific substance. Thus bovine kidney and brain are effective when given orally but not when given parenterally. Desiccated hog's stomach is effective when given orally but not when given parenterally and is not heat stable.

The deficiencies in pernicious anemia are probably multiple. In addition to the shortage of the specific hepatic substance, there is undoubtedly vitamin B complex deficiency resulting from long-standing anacidia, deficiencies in diet and impaired absorption. A definite deficiency in thiamine is suggested by the therapeutic results of Zillhardt (Zillhardt, J. C.; Howard, Isabel, and Murphy, W. P.: *Ann. Int. Med.* 15:33 [July] 1941). In cases of residual stationary neurologic findings, optimum liver therapy should be supplemented with adequate thiamine hydrochloride, given parenterally.

In treatment, many physicians prefer crude liver extract; others have found the concentrated extract quite satisfactory. Reticulogen was used in Askey's study because of its great concentration. Its vitamin B₁₂ content is 1,000 international units per cubic centimeter, not 100.

Two patients in the study who did not receive reticulogen were indicated by an asterisk (patients 16 and 18 in the table, after ages 84 and 66).

The added improvement resulting from the administration of whole liver and hydrochloric acid to a patient receiving adequate parenteral treatment is probably due not to a needed hemopoietic factor but probably to other vitamin factors in whole liver. Hydrochloric acid is of undoubted value in certain cases; in the majority it has proved unnecessary if optimum liver and vitamin therapy is given.

CEREBROSPINAL FLUID PROTEINS IN ACUTE POLIOMYELITIS

To the Editor:—In acute anterior poliomyelitis it has been noted that during the period of recovery the total protein of the spinal fluid rises as the cell count falls. On the other hand, in the report of Viets and Warren (*Acute Lymphocytic Meningitis*, *The Journal*, Jan. 30, 1937, p. 357) it appears that in lymphocytic choriomeningitis the total protein of the spinal fluid rises and falls as the cell count rises and falls. Do these conditions occur regularly enough so that they can be used as a valid means of distinguishing the meningeal type of acute anterior poliomyelitis from lymphocytic choriomeningitis?

Irving Kowaloff, M.D., Brooklyn.

ANSWER.—The reports are insufficient in number to justify the generalization that in acute anterior poliomyelitis during the period of recovery "the total protein of the spinal fluid rises as the cell count falls." The case reported by Ayer and Trevett (*Acute Poliomyelitis with Choked Disks: Notes on Prolonged Observation of the Spinal Fluid and the Use of the Respirator*, *Arch. Neurol. & Psychiat.* 31:396 [Feb.] 1934), on which this statement is largely based, was observed for five months; both the pressure and the protein remained elevated. The patient was extensively paralyzed, including the muscles of respiration, but recovered in part, only to die within a year of pneumonia. This single case, complicated by a relapse and the presence of choked disks, cannot be considered as being typical of poliomyelitis.

No other patient has been observed with complete spinal fluid examinations as long as the one reported by Ayer and

Trevett. Most reports mention the condition of the spinal fluid at the end of three to six weeks after the onset of the disease. By that time the fluid is usually normal, but numerous instances have been reported in which the protein has remained elevated into the second and third months. One needs more reports of observations as long as the one of Ayer and Trevett; even examinations six to twelve months after infection would be justified to clear up the obscure point of how long the protein remains elevated in the average, not the exceptional, case.

Repeat examinations of the spinal fluid, even a year or more after the beginning of the disease, have been recorded in cases of acute lymphocytic choriomeningitis. Even in the acute stage, neither pressure nor protein is often much above normal; both fall rapidly to a normal level. If the data for poliomyelitis were as complete as those for lymphocytic choriomeningitis, some correlation between the two findings might be made. The two diseases, however, can usually be easily differentiated on other grounds; comparisons between the spinal fluids would hardly be a valid means of distinguishing one from the other in view of our present scant knowledge of the spinal fluid in poliomyelitis many months after the onset of the disease.

It should be pointed out, moreover, that in many instances specific antibodies may now be demonstrated in the blood in lymphocytic choriomeningitis and that virus identification by laboratory methods for both diseases is now available.

RADIOACTIVE PHOSPHORUS IN LEUKEMIA

To the Editor:—Is there available information on the new experimental treatment with energized phosphorus for lymphatic leukemia?

John H. Henkin, M.D., Sioux City, Iowa.

ANSWER.—The question probably refers to the use of artificially induced radioactive phosphorus in the treatment of leukemia and in allied conditions such as lymphosarcoma and polycythemia. Radioactive phosphorus, which has an atomic weight of 32 instead of 31, the atomic weight of ordinary phosphorus, is produced by bombardment of ordinary red phosphorus in the cyclotron with the nuclei of heavy hydrogen, which are called deuterons. A neutron is captured by phosphorus 31, converting it into phosphorus 32, which is radioactive, emitting rather penetrating beta rays. In experiments on animals it was found that when phosphorus was first built into sodium phosphate and then injected into animals it concentrated in bone, leukemic and neoplastic tissues generally. It therefore seemed logical to use radioactive phosphorus as a form of selective radiation therapy in the treatment of leukemia, lymphosarcoma and allied diseases. The results obtained so far, extending over about four years, show that this method produces results which seem to be as good as those following roentgen or other treatment, but the work is still in the experimental stage. Present advantages seem to be the lack of any radiation reaction or sickness. Following are references describing some of the early investigations along this line:

Erf, L. A., and Lawrence, J. H.: Clinical Studies with the Aid of Radiophosphorus: III. The Absorption and Distribution of Radiophosphorus in the Blood of Its Excretion by and Its Therapeutic Effect on Patients with Polycythemia, *Ann. Int. Med.* 15: 277 (Aug.) 1941.

Lawrence, J. H.; Scott, K. G., and Tuttle, L. W.: Studies on Leukemia with the Aid of Radioactive Phosphorus, *Internat. Clin.* 3: 33 (Sept.) 1939.

Erf, L. A.; Tuttle, L. W., and Lawrence, J. H.: Clinical Studies with the Aid of Radiophosphorus: IV. The Absorption of and Distribution of Radiophosphorus in the Blood of, Its Excretion by and Its Therapeutic Effect on Patients with Leukemia, *Ann. Int. Med.* 15: 487 (Sept.) 1941.

LEG CRAMPS IN PREGNANCY

To the Editor:—I wish that you would discuss the cause and treatment of cramps of the leg during pregnancy. It is a minor symptom but sometimes causes the patient considerable discomfort. M.D., Michigan.

ANSWER.—Cramps or muscular contractions occur commonly in pregnant women. Cramps in the legs are especially frequent, often occurring during the night. They are more troublesome in the second half of pregnancy. There may be a connection between the cramps and lack of vitamin D and calcium. Hence increasing the vitamin D and calcium intake may decrease the incidence of cramps. During an attack massage helps; likewise, standing on a cold floor, such as the tile floor of a bathroom, usually relieves the muscular spasm. Frequent change of position in bed may help to prevent these cramps. Pains down the legs, shooting in character, often occur and are due to pressure of the baby's head on the nerves which go to the legs. These pains may be relieved by change of position, particularly a change to the knee-chest position.

THIAMINE HYDROCHLORIDE AND FURUNCULOSIS

To the Editor:—Please give an opinion as to the belief apparently held by some physicians that the use of thiamine hydrochloride predisposes to attacks of furunculosis. If there is any foundation for this belief, a discussion will be appreciated.

E. S. Parker, M.D., Ida Grove, Iowa

ANSWER.—There is no scientific foundation for the belief that the administration of thiamine hydrochloride under sterile precautions predisposes to attacks of furunculosis. Apparently the clinical incidence of thiamine and other vitamin B deficiencies is greater during the summer months than in any other period of the year. Likewise, the incidence of furunculosis and carbuncles is said to be higher during this period. The sole justifiable cause for the administration of thiamine hydrochloride is the evidence of a deficiency of this substance. It is usually recommended that the physician give the patient a well balanced diet irrespective of the administration of a specific vitamin preparation.

LYMPHATIC FLOW

To the Editor:—Kindly inform me if the lymphatic flow or current is always from the periphery to the center. Is it possible, in case of blocking lymph tract, for the lymphatic flow then to establish a reversed flow?

Marshall J. Payne, M.D., Staunton, Va.

ANSWER.—The last question is answered first: There can be no reversed flow without damage to the wall of the vessel. The question appears to be suggested by the occurrence of edema in an area where lymphatic drainage is blocked. This is due to accumulation of fluid and not to reversed flow.

It is not entirely clear what is meant by the phrase "periphery to center." In general, lymph channels tend to follow much the same course as veins, the entire flow finally entering the veins at the base of the neck. In limited areas there are often exceptions to the general direction of flow, but ultimately the rule holds.

CHANCES FOR PREGNANCY AFTER LONG PERIOD OF AMENORRHEA

To the Editor:—A woman aged 29 had two uneventful pregnancies, the last one being in 1934. She has not menstruated since 1938, apparently because of glandular disturbance. She is moderately obese but otherwise is in good health. Without treatment is there any further possibility of pregnancy? Is treatment indicated for any other reason?

M.D., Iowa.

ANSWER.—The likelihood of a pregnancy during a long period of amenorrhea is rather remote. Usually ovulations do not occur. However, pregnancy is not impossible, for women can conceive during the amenorrhea of the postpartum period and during periods of secondary amenorrhea. Treatment is not indicated simply for the restoration of the menstrual function. Amenorrhea of this type may be the result of thyroid insufficiency, in which case there may be other signs of hypothyroidism which may call for treatment.

FUNGICIDES?

To the Editor:—Please advise me as to sodium orthobenzylphenol and sodium parabenzyphenol used as a preventive of ringworm. Also let me know as to any bad effects from the use of a combination of these solutions.

Joseph A. Geis, M.D., Lake Placid, N. Y.

ANSWER.—A thorough search of the medical literature has revealed no reference to the fungicidal and fungicidal values of either sodium orthobenzylphenol or sodium parabenzyphenol. Without accurate mycologic studies it is impossible to give any opinion.

IS POLAR BEAR LIVER POISONOUS?

To the Editor:—With regard to the query in The Journal, January 24, R. L. Sutton Sr. and I spent several weeks of the summer of 1932 hunting bears and seals along the north coast of Spitsbergen. Our ship's crew of eighteen Norwegians were unanimously of the opinion that polar bear liver is poisonous both to man and to dogs. Ernst Sorensen of Tromsø, our guide and interpreter, was a man of remarkable learning and accuracy of statement, intimately familiar with Spitsbergen history and polar exploration. From his personal knowledge he described to me instances of ill effects from ingestion of polar bear liver. Nausea, diarrhea and collapse were specified, along with emphasis on the appearance of erythema especially on parts exposed to sunshine. Judging from his words, I thought it likely that photosensitization might have been induced. I have seen no mention of this, however, in reading considerable literature dealing with photosensitization. I put several pounds of polar bear liver in mason jars, intending to investigate the matter, but during our travels before returning to the United States it seemed less and less desirable to carry the material in my suitcase, and I discarded it.

Richard L. Sutton Jr., Kansas City, Mo.

